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ABSTRACT

The state of research in academic obstetrics and its relationship to research in other academic disciplines was addressed in a 1979 conference. Participants included representatives of academic obstetrics, academic pediatrics, and public health. After an introductory discussion by Howard C. Taylor, Jr. on changes in obstetrics in the last 25 years, the 16 conference papers are presented in the following sections: (1) "Departments of Obstetrics," as viewed by a non-expert and by a pediatrician; (2) "Support of Academic Obstetrics," coming from both the public and the private sector; (3) "Education in Academic Obstetrics," which included discussions on a school of family and community medicine and on the value of "a major clinical service" in the academic field; (4) "Current Residency Requirements" at the American College of Obstetricians and Gynecologists; and (5) "The Impact of Reproductive Biology on Academic Obstetrics," as viewed by an endocrinologist and an obstetrician-biochemist. Included in this section are discussions of the impact of perinatology on academic obstetrics, the relationship of departments of obstetrics to other medical school administrative units, and the relationship of obstetrics and pediatrics in a changing world. Finally, the needs of academic obstetrics are assessed along with suggestions on how to meet them. (PJM)

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THE CURRENT STATUS AND FUTURE OF ACADEMIC OBSTETRICS

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Edited by
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and
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THE CURRENT STATUS AND FUTURE OF ACADEMIC OBSTETRICS

Report of a Conference
Supported Jointly by the
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and the
Josiah Macy, Jr. Foundation

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Introduction

Academic obstetrics is currently at a stage where it is possible to reflect on past developments; to assess the current state of the specialty; to chart directions for the future; and to determine what actions must be taken now to set a course for the future.

The Macy Foundation, in cooperation with the National Institute of Child Health and Human Development, convened a conference in Williamsburg, Virginia, on 24 to 26 June 1979 at which it brought together leading representatives of academic obstetrics, academic pediatrics, and public health to examine the state of research in obstetrics and to consider it with reference to that in other academic disciplines.

The group's discussions began with a presentation on the evolution of academic obstetrics by Howard C. Taylor, Jr., M.D., the author of a clasic study on the subject, followed by reports of recent surveys of academic obstetrics in selected American medical schools by Clifford Grobstein, Ph.D. and Henry L. Barnett, M.D. The remainder of the two days was spent in discussions of various aspects of academic obstetrics in this country and in the British Isles.

After the participants had recommended directions for the specialty in the future, they concluded that a critical element is the training of senior research obstetricians, who will become leaders in the field during the next decade. The group also agreed that a program of senior fellowships dedicated to training clinical

investigators should be inaugurated. Such a program will perpetuate and enhance research in the prevention and treatment of the major disorders that affect the pregnant woman, the fetus, and the infant.

John Z. Bowers, M.D., *President*
Josiah Macy, Jr. Foundation

Norman Kretchmer, M.D., Ph.D., *Director*
National Institute of Child Health
and Human Development

14 December 1979

Changes in Academic Obstetrics in the Last Twenty-Five Years

Howard C. Taylor, Jr.

INTRODUCTION

Over the last few years my usual topic for a short address to groups of friendly, and usually respectful, colleagues has been somewhat different, namely, "Changes in Obstetrics and Gynecology during the Last Fifty Years." That subject provides me with the comfortable assurance that no one in the audience—or almost no one—will contradict me. The last twenty-five years present a more difficult problem, however, partly because most people at this conference have shared these years with me and have their own interpretations, and partly because the revolution that turned academic obstetrics into a modern medical discipline began and developed during this period.

The academic obstetrics of twenty-five years ago was on the verge of dramatic reforms. The heads of departments and other leaders, however, had not been trained in organization or in much of the subject matter that was to characterize today's departments. They were good clinicians eager to advance their specialty, but with only vague ideas of how to proceed. It has been a quarter-century of innovation, sometimes by trial and error, assisted by a measure of imitation of certain other medical school departments that twenty-five years ago were a generation or so ahead of us.

Yet, on the other hand, if one looks closely enough, principles and practices common today were in embryo at that time. I believe, then, that in considering the recent history of academic obstetrics we must look at the implementation of ideas rather than

at the initiation of entirely new ones. But this of course is true of most of history.

There are various ways in which the changes in obstetrics over the last twenty-five years might be characterized. I have decided to try to do it under three headings that I believe the conference will be considering in some detail:

- First are external influences or pressures that have imposed many changes on us. I use the term "external influences" to designate the cultural, social, and economic factors to which our clinical services, our curriculum, and our research directions have had to respond.
- Second are the actual changes in subject matter for instruction. In some instances these have been simple changes in emphasis, but in others there has been the introduction of quite new areas of work and topics.
- Finally, there are the innovations that have resulted from the required organization of teaching departments, and indeed of the practice of the specialty.

CHANGES IN THE EXTERNAL ENVIRONMENT

It is often difficult, even impossible, to identify the ultimate source of changes in institutions or systems of ideas. In academic obstetrics the source may be thought of simply as the continuation of an already established line of evolution; as ideas generated internally among the workers in the field; or as a result of external forces developing within and exerted by the community. Admitting the participation of all three mechanisms, I prefer to first stress the external forces, for without reference to them the changes in obstetrics in the last twenty-five years are only partly intelligible.

The Rise of Scientific Research

The first, and perhaps most effective, external force affecting academic obstetrics in the last quarter-century has been the growing public worship of science and its elevation of research to a pinnacle of almost religious observance. This value is so diffused

throughout society, at least among the literate and articulate, that we have come to accept it as a natural ingredient of our culture.

Research has been with us at least since the days of classical Greece; what is more recent is the universality of interest and approval. One might cite the eagerness of the public for reports in the media of new discoveries; the voters' willingness to permit the expenditure of taxpayers' money; and the selfless work of literally millions of people in raising money for campaigns of voluntary health foundations. The people, with some noisy exceptions, believe in *science*, and with this goes the mandate that scientific progress continue.

Medicine is of course only one of the beneficiaries of the resulting new sources of wealth. Deans of medical schools know, however, that far more financial support can be obtained from government than from grateful patients of former days. The professor of obstetrics, as in other medical disciplines, knows that relative excellence is most likely measured by research achievement, for superiority in teaching and patient care is hard to quantify or publicize. The material rewards for such research excellence have only recently come to be exploited, but I believe the great promise of research in the field of human reproduction is being increasingly appreciated.

External Control and Regulation

The next group of outside influences includes the growth of external institutional controls by government and government-related agencies, and by medical societies conscious of the need to supervise their members. One need only mention the efforts to reduce the number of so-called unnecessary surgical operations; standards set by insurance plans regulating the length of paid hospital stay; and the work of tissue committees that review the justifiability of certain specimens reaching the pathology laboratory. The size and frequency of malpractice suits, with awards that often appear capricious, has become a factor in decisions to be added to purely medical judgments. These external forms of regulation of practice affect the freedom of action of academic depart-

ments of obstetrics and require some special attention in the curriculum.

Popular Concepts of Appropriate Services

Another external influence is the continuing insistence of lay persons, singly or in organized groups, on their right to determine the manner in which medical services, especially obstetrical, are to be provided. Some of their proposals have a measure of value and have led to useful modifications of routines. Others seem to have only a sentimental origin, buttressed with dubious psychological theories. Among the more reasonable have been the various regimens of so-called natural childbirth, rooming-in for the baby, and the return to breast-feeding. The role of the midwife and her relationship with the obstetrician has become a logical area for discussion. Less clear are the justifications for home deliveries, especially the "do-it-yourself" type and the "family-centered delivery," with the husband, having reached the labor room, now asserting his right to be present at cesarean section.

The ritual of "early bonding" seems harmless enough, but the specter raised of the "male-chauvinist gynecologist" may have serious effects on the doctor-patient relationship. All these ideas must be dealt with by teachers and practitioners, and, by being almost beyond proof or disproof by our trusted statistical methods, they leave us uncertain, frustrated, and sometimes resentful.

Control of Conception and Continuation of Pregnancy

Finally, in the last twenty-five years there has been a growing demand for the expansion of services into a field that, in its universality, is relatively new. This is based on the general assumption that the obstetrician is responsible for contraceptive advice, and, more recently, for the radical requirement that he terminate pregnancy on request. I will make further reference later to the increasing attention being paid to this aspect of academic obstetrics.

CURRICULAR REFORMS

The reforms in the academic obstetrics curriculum over the last twenty-five years may in part be attributed to the cultural and

social changes just reviewed, and in part to technological innovations too many to enumerate. May I now review some of the more important developments that have occurred in the teaching and practice of obstetrics.

Gynecological Surgery

The surgery of the specialty, chiefly in the form of various gynecological operations and operative deliveries, has become progressively less important. Gone are the days when a great, if somewhat flamboyant, British professor could boast that, "Oh yes, I profess *obstetrics,* but I *do* gynecology"; or the great period in Vienna when radical surgery for cancer of the cervix was the special prerogative of the "herr professors," who competed to see who could excise the uterus with the largest attachment of trailing parametria, respectfully termed "the Emperor Franz Josef's whiskers."

The reasons for the decline in prestige of the surgical part of the specialty are many and, for the most part, logical: the competing glamor of the newer surgery of the brain, heart, and vascular systems; the extension of the privilege of doing surgery to a horde of certified gynecologists; the increasing scope of radiation, and, more recently, some success with chemotherapy; the diminution in numbers and severity of injuries to the pelvic floor as a result of a less traumatic obstetrics; the absorption of the few remaining special departments of gynecology into combined departments; and finally the apparently more challenging opportunities for research in obstetrics and in the endrocinology of reproduction.

Obstetrics

In contrast to gynecology, obstetrics has expanded greatly in importance and has undergone far-reaching changes in its practice and in the relative emphasis given to its different aspects.

The problems of maternal mortality in the United States were largely solved, not during the last twenty-five years but in the previous quarter-century. There has been continuing improvement, to the extent that, for example, in a series of 22,499 deliver-

ies performed at Columbia-Presbyterian Hospital in the period 1968–73 there were only eight maternal deaths, of which only three were ascribable to obstetrical causes.

If our concern with academic obstetrics extends to teaching in the developing countries, maternal survival still remains a major factor. In one African hospital, in a series of 22,280 deliveries supervised during the same years there were 183 maternal deaths, essentially all due to obstetrical causes, although the cases were often complicated by debilitating chronic illness.

The safety of mothers being to a degree assumed, attention in America and in other countries has turned to the welfare of the fetus and the newborn. In these areas substantial improvements began to be seen over twenty-five years ago.

Looking up the records for the period of my residency at the New York Lying-In Hospital, I found no mention of perinatal mortality in the *1927 Annual Report*. In the presence of a complicated situation the obstetrician would at that time comfort himself that, even if the child were lost, the endangered mother had been safely delivered.

In the next quarter of a century all that was changed; by 1954 the perinatal mortality rate at Columbia-Presbyterian was 25.4 per 1,000 live births on the ward service and 20.4 on the private service. In the last twenty-five years enormous efforts, both clinical and research, have been extended toward the elimination of the next percentage point. This has been accomplished by several means: amniocentesis for the detection of congenital defects; various antepartum tests for detecting fetal jeopardy; fetal monitoring during labor, with an accompanying fantastic rise in cesarean section; and intensive care of the threatened newborn, especially of underweight, premature babies. The complexity of many of these procedures has added a technological and scientific quality to both obstetrical practice and teaching.

One important aspect of fetal welfare destined to become of increasing concern has been only superficially and intermittently considered in the last quarter-century. This is the study of the effects on the potential future development of the offspring of an unfavorable intrauterine environment and of conditions pertaining during and immediately after delivery.

Endocrinology

Although the action of the anterior pituitary on the ovary was reported as early as 1927, it is only recently that gynecological and obstetrical endocrinology has come to be recognized as a more or less distinct subdivision. The diagnostic techniques in the field are complicated and specialized, and research occupies much of the attention of workers in the field. Endocrinology has already had a major influence on academic obstetrics and gynecology, for it has brought to the department individuals of special intellectual tastes and greatly broadened the basic science foundation of the discipline.

Besides these more or less traditional, although evolving, aspects of the field, there are certain relatively new peripheral functions that we are being asked to fill.

Public Health

Many aspects of our discipline are more similar to certain aspects of public health than to those of a branch of individual therapeutic medicine. Our addiction for statistical data and clinical results is evidence of this relationship. The routines of antepartum care, the development of so-called outreach health service programs, and the widespread application of the Papanicolaou test indicate a broad preventive approach. A number of persons trained chiefly in clinical obstetrics and gynecology have made a rather easy transition to posts in public health departments of maternal and child health. A growing interest in prevention and in the general aspects of women's health has been characteristic of the years just past; perhaps this area should be more specifically recognized in the medical curriculum.

Family Planning

The most far-reaching development in academic obstetrics—almost new in the last twenty-five years—is what is rather loosely termed "family planning." The term implies the parents' foresight with respect to the timing and number of children they wish to have, and requires for the physician the teaching of techniques and, in many instances, the induction of abortion. The boundaries of the field have become indistinct because they have expanded

to include marriage and sex counseling, areas easily accessible to amateurs, and controversial, in terms of content and objectives, to the most thoughtful professionals.

The teaching of family planning has had to cope with various theological and ethical conflicts. Opposition to induced abortion is absolute for a considerable portion of our population, as well as for their physicians. Even more common, though less explicit, is the conflict between the physician's primary duty toward her/his patient and the conviction, sometimes little short of fanatical, that birth rates should be lowered for the common good and that the patient should be persuaded to play her part.

Medical schools differ widely in the curriculum time devoted to family planning and are frequently criticized by outside proponents for neglecting such an important field. The chief impediment to well-developed instruction in family planning does not, I think, stem from theological or ethical contradictions, but rather from the sense of superiority of both clinicians and researchers toward what they regard as the triviality of birth control instruction and procedures. Teaching in this field requires a different, very special type of individual who can see beyond simple instruction and convey a sense of the enormous importance of correct family planning for the individual and for society. A few such individuals have appeared in the last few years, but the majority of academic departments have not succeeded in including this topic as a vital part of their curricula.

EVOLUTION IN THE ORGANIZATION OF DEPARTMENTS

The changes in society's attitude toward reproduction and changes in the content of instruction in academic departments of obstetrics and gynecology have been parallelled by major reforms in administration, in the qualifications of teaching personnel, and in the magnitude of financing.

Laboratories and Research

The most fundamental change, and the initiating factor in some others, has been the development of laboratory-based re-

search. I use the qualifying phrase "laboratory-based" because, with the obstetrician-gynecologists' fondness for statistics, they have for years done notable research on factors related to maternal and fetal outcome and to the best means of raising the five-year cure rate in the various forms of cancer.

The establishment of laboratories in all clinical departments has, for the most part, occurred in the last fifty years. When the Columbia-Presbyterian Medical Center was conceived and opened in the late 1920s little or no laboratory space was assigned to the clinical departments on the assumption that research on human problems would be accomplished by cooperation between clinicians and basic scientists. Of course this arrangement rarely worked—their training, points of view, and personal objectives were too dissimilar. Eventually some laboratories began to be provided within clinical departments, first in internal medicine and then in other disciplines.

In this process obstetrics and gynecology was much hampered, perhaps because such success was being achieved by statistically controlled improvements in maternal and fetal mortality, or perhaps because of the physical burden being carried by the voluntary or part-time practitioner-teacher. (A University of Pennsylvania professor of medicine once explained to me that an obstetrician operated essentially at midbrain level, the higher center being paralyzed by fatigue and loss of sleep. Hence, he believed, little imaginative research in the field was possible.)

Progress toward an active research program in academic obstetrics has been rapid in the last twenty-five years. Without attempting to enumerate actual discoveries, they may be measured crudely by a count of the full-time research workers in the clinical departments of American medical schools and by financial support available from governmental agencies, private foundations, and pharmaceutical houses.

Expansion of Full-Time Staff

A second major organizational development, in part the result of emphasis on the research function, has been a shift toward the

principle of full-time staff. This topic will receive special attention later in the conference so I shall not cite figures.

Suffice it to say that a revolution has occurred in the personalities, sources of support, and life-time objectives of the most active members of most academic departments of obstetrics. This radical change was essential if research was to be done on the present scale, but it has resulted in many innovations such as perceived qualifications of the chairmanship and a new hierarchial order within departments. These new intellectual standards for teaching will to a degree be reflected in the ideas and values of future practitioners.

A single question may be raised about some aspects of the reform. Will the relatively sheltered full-time teacher convey the subtleties and hazards of practice as competently as the dedicated practitioner who has stayed up all night worrying about whether a cesarean section may be needed for the safe deliverance of a particular woman in labor? Students who see themselves as future community clinicians may have some confusion in identifying role models.

Basic Science Members of Departments

With the expanding range of interests in academic departments of obstetrics and gynecology it has become common practice to appoint as members persons in other disciplines: biochemists, psychologists, pathologists, psychiatrists, and sociologists, for example.

The system of such appointments has become essential over the last twenty-five years, especially for the development of research. Yet it has brought certain problems. Nonmedical scientists, conscious that they will never be obstetricians, often fret about their academic futures, feeling isolated from the primary departments to which their skills relate them. This problem may be partly solved if the academic department of obstetrics departs still further from its concept of itself as essentially clinical and moves toward the vision of a department concerned with many aspects of the reproductive process.

Collaboration with Other Departments

A growing trend in the last twenty-five years has been toward collaborative work among various departments of the medical faculty, resulting at times in a blurring of traditionally sharp territorial boundaries. In 1959 I discussed this topic in a paper entitled "Competition and Collaboration."[1] The need for a measure of cooperation was obvious even then, but there was a fear of the competitive invasion of the field by the general surgeon, who was suspected of yearning to do hysterectomies; by the internist, who wanted to treat such complicating illnesses as preeclampsia; and by the pediatrician, who seemed to be threatening to undertake the antepartum care of the fetus.

The surgeon and the internist, perhaps because they have been engaged in new and exciting developments, appear to have become less of a threat. With pediatrics, collaboration without too much competition is essential. Indeed the affiliation of the two specialties has long existed: many textbooks of a century ago had titles such as *Diseases of Women and Children*. In those days the obstetrician's fee, in some places at least, assumed the care of the newborn during its first year.

Yet a somewhat ambiguous situation has come about: in some medical schools specialists from two different departments appear to be converging in the hours before, during, and just after birth. As perinatologists, a relatively new term to me, we either have pediatricians who are almost obstetricians or obstetricians who are almost pediatricians. Perinatology seems to have become a field open to both disciplines.

The Development of Subspecialties

An informal division of obstetrics and gynecology into subspecialties, based on the particular interests or competencies of individuals, has been evident in academic departments for many years. Their formal recognition, with certification in the fields of oncology, maternal and fetal medicine, and endocrinology, is the recent culmination of this trend.

This recognition of subspecialties will, I believe, have far-

reaching and still unpredictable effects. Subspecialization should improve clinical management, at least of rare or complicated conditions. It should do much for research, partly because investigative techniques have become more specialized, and partly because when limits are placed on the breadth of an individual's field of work she/he naturally tries to compensate by striving for greater depth.

Of course there will be attendant problems. Subspecialization may shatter the unity of obstetrics and gynecology, finally achieved after so many years of endeavor. Yet perhaps the emergence of highly trained and experienced subspecialists in oncology, fetal and maternal medicine, and endocrinology may be necessary if these subjects are to be retained within a larger, if looser, department.

Women Faculty

My last item is of very recent origin, but it should be on our agenda. I refer to the increasing numbers of women entering medical school and the rising proportion of women in obstetrical and gynecological residencies throughout the country. The figures indicate the virtual certainty of women's greater influence on the specialty in the future.

That a majority of obstetricians should be women is not viewed internationally as an entirely new situation. In countries so otherwise different as the Soviet Union and India, most practitioners of obstetrics and a fair number of teachers are women. In India a so-called "lady doctor" is a female physician, but also by implication a doctor for women.

What such a change in gender might do to the instruction and practice of obstetrics in the United States is hard to predict. At a distance, in the two countries noted, specific changes attributable to the feminine influence do not appear to be apparent, perhaps because obstetrics in these countries is still "male dominated."

The women of America may be of a different breed, bringing more of the spirit of Women's Liberation into their professional lives. There are many areas of obstetrics and gynecology for which

it can be claimed that a woman's innate personality and particular point of view can make specific contributions. Americans are optimistic and believe that change usually means progress. We can hope that the influence of women's special perceptions and sensitivities may indeed result in progressive change.

CONCLUDING DISCUSSION

Although I may have seemed to dwell too much on where academic obstetrics stands now, the present situation is the result of the aspirations and strivings of the last twenty-five years. These years have been revolutionary ones for the specialty, especially its academic aspects. Standards the practitioner must be prepared to meet have been established; many fields of needed research have been identified; and organizations and personnel for many purposes have been built up.

Now it seems we are ready and partly rehearsed for fundamental work in the vital, apparently limitless, field of human reproduction.

NOTE

1. Howard C. Taylor, Jr., "Competition and Cooperation," Presidential address to the American Gynecological Society, *American Journal of Obstetrics and Gynecology* 76 (1958): 931-38.

Discussant:

Louis M. Hellman

As Taylor pointed out, only the elderly are asked to speak on past history. I, too, can be classified as elderly, but perhaps separated by a generation from him in terms of the beginning of significant federal grant programs.

I found troublesome, as did Taylor, the twenty-five year break chosen as the hallmark of this conference. Except for the fact that

twenty-five years occurred within the memories of most of those at this conference, just preceding the baby boom that peaked in 1958. I think of only one good academic reason for selecting that period; it marked the founding of the National Institute of Health's Study Section on Human Embryology and Development, which initiated a substantial increase in research funding in our specialty. Furthermore, the founding of that study section formed the base for arguments in favor of inaugurating the National Institute of Child Health and Human Development some ten years later.

Regardless of where the take-off point of our discussion logically falls, no academician can ignore the lessons of the very long and illustrious history of our specialty. He who does so is bound to repeat errors of the past. Some of the points of consumerism—the widespread use of fetal monitoring without controlled proof of its value, for example—may be cases in point. Certainly the lack of meticulous sterility at delivery could foreshadow a return of the problems confronted by I. P. Semmelweis and Jakob Koletschka.

Taylor's talk covered so thoroughly the vast changes taking place in academia during the five quinquennia under consideration that I am hard pressed to find any new points for discussion. Let me, however, take up two issues. Both entail academic leadership.

First is the philosophical and practical basis for the pronounced change in obstetrical practice from conservatism to dynamism that has occurred within your lifetimes and mine. The second concerns the implications of improved access to the fetus in utero, of which we have seen but the beginning in amniocentesis, fetal monitoring, and sonography.

Addressing the first point, let me violate the historical boundary set us and glance at the past as the base for what has been a fundamental change from an exquisite and often dangerous mechanical art to a greatly simplified approach to childbirth, namely: if you see or suspect trouble coming, deliver by cesarean section.

In making this change some of the glamor and excitement

that attracted many of us to our specialty has been lost. Gone are the complicated forceps delivery, the difficult breech extractions, the two-, four-, and five-day labors where the problem was to keep both the patient and the obstetrician from death by exhaustion. Gone are the complex maneuvers to control bleeding in placenta previa and abruption. Gone, too, are the complex methods of obstetrical pain relief. Lost is the ability to perform version and extraction, and the destructive operations, the bags, the boogies, the weights and pulleys have seen their day and are no longer part of obstetrical practice. What used in practice to be called blood-and-thunder obstetrics has been replaced by simpler practice.

How did ultraconservative obstetrics find its beginning? How did the philosophy of "nature knows best" and "tincture of patience and essence of time" come to be code phrases familiar to all students? In the first place there was either no cesarean section, or it was most hazardous because of the dangers of hemorrhage and infection. Second, after William Smellie retired in 1760 the forceps became much abused and obstetrical practice quite radical. Overreacting to this radicalism, William Hunter, Thomas Denman, and William Osborn introduced a retrogressive form of obstetrics. Denman's classic text, *An Introduction to the Practice of Midwifery*,[1] first published in 1802, became an obstetrical bible. But its concepts became laws so restrictive they inhibited obstetrical thought.

In speaking of this phase of evolution, Robert Barnes stated before the Obstetrical Society of London in 1897 that:

> These illustrious men thought it right to exert their authority in discouraging the use of instruments and indicating a blind faith in nature as the better way. So earnest was their zeal, so commanding their authority that men were driven into the opposite extreme of supine inaction. . . . Rules were laid down and widely obeyed which too often allowed parturient women to drift into danger, injury and death.[2]

Although not so rigidly followed, ultraconservatism persisted in the United States until the end of World War II. A few such as Joseph DeLee foreshadowed a change with the use of episiotomy and elective forceps, just as did Fred Irving of Harvard with his

academic acceptance of oxytocin stimulation of labor and his pungent sarcasm: "It is difficult to know when watchful waiting becomes hopeful procrastination." These academicians spoke to a more radical approach to delivery, to greater activity, and to the exercise of better judgment by the obstetrician.

It was not until after the war, however, that cesarean section rates began to rise markedly. The war had given us freer use of transfusion, conquest of infection with antibiotics, and better anesthesia. With the advent of increased numbers of cesarean sections and the lessened danger of infection and hemorrhage, maternal mortality diminished to an insignificant rate.

Attention then turned, as Taylor mentioned, to perinatal mortality. Difficult manipulative obstetrical procedures disappeared one by one. Cesarean section rates rose from an accepted 4-5 percent to 15, 20, and even 40 percent. The results, although gratifying, were not precipitous. The perinatal mortality rate fell in a relatively straight line.

In the twelve-month period ending in April 1979 infant mortality in the United States stood at an all-time low of 13.5 per 100 live births; the perinatal mortality rate of infants weighing over 1,000 g. was 8.1 for the first quarter at the Downtown Medical Center of the State University of New York.

Obstetrical practice, even with the subspecialty of fetal medicine, cannot take sole responsibility for this drop. There has been a vast improvement in pediatric care of the newborn, especially with the advent of high-risk nurseries and meticulously trained neonatologists. The high technology necessary to accomplish these feats is expensive, and sometimes money is wasted. How restrictive government interference in these advances will be is difficult to foretell, but without knowledge of the workings of government on the part of academic leadership progress will be slow indeed.

The second issue I wish to discuss bears on one possible scientific advance for our specialty. For many years the fetus in utero has proved relatively inaccessible. In fact we can study the physiology of man in space with relatively greater ease than we can the fetus. Early X-ray procedures proved relatively ineffective and inaccurate in the study of fetal growth, and, as we learned more about the hazards of X-rays, they became inadvisable.

In the last twenty-five years studies of amniotic fluid have yielded both diagnosis and prognosis in Rh disease, and have contributed in some small degree to its treatment. They have also yielded an abundance of detail regarding genetic diagnosis.

Electronic fetal heart recording is widespread in this country and in many places in the Western world, and the saving of fetal lives, especially in high-risk pregnancies, is evident. How much more information will become available from the study of the fetal heart is a moot question.

In my opinion, one of the most fruitful advances occurred with sonography in the 1950s and 1960s. From the first crude pictures by Joseph Holmes, Douglass Howry, Horace Thompson, and Ian Donald to the "real time grey zone" sonograms of today we have gained a tremendous amount of information regarding early fetal defects, placental growth and location, and fetal growth.

A great advance stemming from fetal accessibility, however, will occur in the treatment in utero of various defects and diseases. Today we make diagnoses and treat, except for intrauterine transfusion, only by abortion or early delivery. Tomorrow I believe we will correct genetic diseases; at first perhaps the hemoglobinopathies, and later maybe others.

We know the techniques for genetic engineering, at least in bacteria—selection of a new or modified DNA for the plasmid, and its absorption. The step to human genetic modification is a long one, but altogether probable. The ethical problems may not be as severe as they now appear.

There are many future paths for academic leaders in our specialty, and most were mentioned by Taylor. If I had to choose among them, and not with any priority, I would elect genetic engineering, political science, and public health. I would not neglect a basic familiarity with ethics.

NOTES

1. Thomas Denman, *An Introduction to the Practice of Midwifery*, 1st ed. (New York: James Oram for William Falconer in Evert Duyckinck, 1802).

2. Robert Barnes, *Transactions of the Obstetrical Society of London* 21 (1879): 121.

ACADEMIC DEPARTMENTS OF OBSTETRICS:

A Perspective

Clifford Grobstein

My role in this conference is not that of an insider or expert, since I am neither an obstetrician nor a physician. I had a first career as a laboratory investigator in experimental embryology and a second career as a university administrator, primarily in biomedical areas. Today I have a third career, one I like to call science in the policy mode. What I can contribute from this background, if anything, is best dignified as perspective. The perspective I shall develop deals with the present and future status of academic obstetrics.

Obstetrics began on a rather narrow intellectual base, moved to a broader one, and now has the opportunity to lay claim to new and even more challenging areas. Since the academic status of a discipline depends to an important degree on the breadth of its intellectual base, I shall portray an upbeat potential for the future of obstetrics, providing the discipline is willing to seize the opportunity.

First, some general statements should be made to underlie the perspective I shall develop. They are what Harold Laski many years ago referred to as "unspoken major premises." I prefer not to leave them unspoken because, while they obviously extend beyond the immediate issues of this conference, they provide a pertinent background to it.

The first statement probably is noncontroversial—the current status of academic medicine, in general, is turbulent, changing, and uncertain. The changing character of the totality of academic medicine clearly will affect the status of any particular discipline. The robust flowering of the Flexnerian concept that occurred after the Second World War dominated academic medicine for a quarter-century. It is now undergoing widespread reevaluation and some significant modification. It was a cliché a decade or two ago, for example, to say that academic medical disciplines require an active and strong foundation. The new physician was to be a scientist with a heart; the stethoscope in one pocket of the white coat would be balanced by a computer printout in the other. Moreover, this new scientist-physician would be provided with both ample resources to expand medical knowledge and a personal income only a little below that of a full-time colleague in clinical practice.

Today, in contrast, academic medicine is faced by a no more than level—and probably a declining—research budget; sharp demands that it adjust its image toward comprehensive caring; and heavy competition in the tertiary service market from affluent and well-trained private physicians. Further, the differential in income between academic and nonacademic physicians, especially in the early career stages, has increased sharply. Academic medicine and research no longer appear to be at the peak of aspiration for many capable medical graduates. Instead, medical schools are finding it difficult to recruit and retain high-quality faculties with research orientation in the face of increasing competition from the nonacademic or quasiacademic sector. Flexner has reason to shift uneasily in his grave.

My second premise relates to the nature of academic medical disciplines. Medical specialties arose primarily out of requirements for patient care, and secondarily acquired status as academic disciplines. This is why nonmedical university colleagues, accustomed to defining disciplines in terms of intellectual content, have considerable trouble understanding the rationale for the departmental organization of a medical school. Consider radiology as a case in point. It originated on the narrow base of a specific

diagnostic modality, but it then pursued the phenomenon of radioactivity into therapy and on into nuclear medicine. The resulting grouping of subspecialties has some technological rationale, but it is breaking down clinically, as radiation oncology, for example, establishes more natural bedside associations with surgery and medical oncology.

The pertinent point is that in medicine each academic discipline must always make sense in health care terms—because it must produce effective practitioners, and because the discipline depends in part on the patient care income it can generate in providing health care.

The third premise is that, even though the impact of health care is primary in establishing medical disciplines, each finds its status on the academic totem pole partly in terms of the substantiality of its intellectual base. A high-ranked discipline cannot be simply a service specialty devoid of an intellectually interesting area of knowledge that it cultivates and applies. Despite strains and tensions, one element of the Flexnerian concept (and of a long tradition extending back through European medical history) is holding firm—the binding of medical schools in greater or lesser degree to universities. Continued academic affiliation requires continuing concern with intellectual content, acting as an important counterforce to the practical dimension of health care. This in fact may be the major significance of medicine's academic connection.

Fourth, subspecialization is splintering and reshaping every major medical discipline. The resulting fragmentation poses major problems for the provision of integrated health care. The fundamental driving force toward specialization, however, comes not from health care provision considerations, but from the new breadth and density of the biomedical knowledge and technology applicable to health care. It is of interest that, even as subspecialization threatens ever greater fragmentation of care, it is creating new subspecialty linkages between the traditional disciplines, as, for example, obstetrics and pediatrics in perinatology. A secondary network of linkages may thus evolve that will combine both practical and intellectual considerations and thereby provide new rationale to the major disciplinary structure of academic medicine.

These premises imply substantial current flux in academic organization. For any major discipline the changing picture presents constraints, but it also opens opportunities. It is therefore a time for bold thinking about the nature and prospects of medical disciplines. My sense is that the future of academic obstetrics affords more opportunities than limits. Before elaborating on this, however, some assessment of the present academic status of obstetrics is in order. What is its current strength within the total firmament?

Ten or more years ago, as a dean recruiting departmental chairmen for a new medical school with a strong research orientation, I became aware that obstetrics and gynecology had a reputation in academic circles as an intellectual desert. I was worried that finding a research-oriented leader in the field would involve a search for a needle in a haystack. Nonetheless we were fortunate in locating an accomplished camel driver who not only knew the existing oases, but how to create one. Moreover, in recent visits to a limited number of academic obstetrics centers, it became clear that the number of such oases is not so limited after all. In fact the question arose in my mind as to whether the desert, rather than the oasis, is the mirage.

Certainly, at the very least, new winds are blowing in academic obstetrics. Research in reproductive endocrinology is burgeoning, and fetal monitoring is not far behind. How wide and how deep the new circulation is cannot be discerned, either from browsing through the literature or from talking to the members and heads of several departments. The "house organs" of obstetrical publications are neither illuminating nor discouraging. Their content suggests that current interests and techniques extend well beyond the traditional concentration on parturitional mechanics. The most significant current research is not published in the house organs, however, but in journals devoted to the basic disciplines such as *Endocrinology*, *Cell Biology*, and the *Journal of Biological Chemistry*. People who publish in these journals generally share my impression that there is considerable stirring within the obstetrical pot. But they are not sure either about how general the more promising currents are in academic obstetrics.

It seems to me it is not in the interest of the discipline to remain in the dark about this question. It is elementary that a reasonably informed picture of an existing situation must be available to bolster any serious proposals for change. How *does* academic obstetrics stack up today among its academic brethren, especially with respect to the quality of research support attracted, of recruits for research training, of space, and of positions allocated to do the job?

Having such information is crucial. The existing overall climate is a tough one in which to even maintain current levels of academic research, let alone launch new initiatives. Yet a number of research areas appropriate to academic obstetrics currently have high social priorities. Some, such as reproductive endocrinology, already are in full swing; others, such as fetal toxicology, are still aborning. To make a competitive case for increased allocations in the tight and tense decision arena of an academic medical center—or in the consciousness of federal budgeteers—requires a clear and convincing status report on how things really are with academic obstetrics. Special emphasis is needed on the agenda, as defined by social needs, and on the personnel, funding, and physical resources available to meet them. Particular importance attaches to the financial, social, and intellectual factors that either favor or disfavor career decisions toward academic pursuits on the part of most capable young obstetricians.

Ancillary to the question of the relative status and performance of obstetrics in the academic medical community are two others: 1) How much variation is there in the status and performance of obstetrics relative to other disciplines in various medical centers?; and 2) Is any consistent overall change occurring? I put emphasis on the matter of *relative* status for two reasons. First, it avoids the knotty question of how much is enough when we are talking about academic activities such as scientific research; there is no absolute answer with respect to obstetrics or any other field. Second, in talking about relative status we clearly indicate that the important consideration governing status is one of academic priorities and choice. In a world of clearly finite resources, academic status becomes crucial in allo-

cation—indeed it is the name of the game. My argument is that if obstetrics is to have a favorable spot on the academic totem pole it is time for a more cogent formulation of its case. In no other way are priorities likely to shift in its direction.

I will accelerate the assessment process by injecting a little clairvoyance. Let us forecast that reliable objective data will show that the relative academic status of obstetrics varies considerably in different medical centers. It seems likely that in a relatively small number of centers obstetrics ranks with the strongest disciplines; in a somewhat larger number it ranks near the middle; but in most centers it ranks among the weakest. Assuming some such pattern, it becomes possible to address a second important question for any desired change of status: What are the favorable and unfavorable differentials that lead to the current relative status of obstetrics?

That of course is a key question. Academic obstetrics functions in an extremely complex, multidimensional matrix. It is, with gynecology, a department in an academic medical center. It is also a component with several roles in both a local and national health care system. It is, in addition, an element in a national research and research training enterprise with multiple support sources. Factors in any or all of these relationships might either inhibit or promote the academic base of a particular obstetrics department or of the aggregate of all obstetrics departments.

Which factors have the most impact in establishing the status of a particular obstetrics department vis-à-vis other departments in the same academic center? Which are most influential in establishing the relative status of obstetrics departments in different centers? Whatever the influential factors are, which are capable of being favorably altered so as to strengthen the status of academic obstetrics?

What kind of factors are we talking about? Some obvious examples are:

- Patient care load and allocation of income generated.
- Number of hard-money positions available from institutional sources.
- Allocation of research space.

- Interactions with local research institutes or centers.
- Attitude of departmental and school administrators toward research, and specifically toward obstetrics research.
- Economic and other factors affecting career choice among young obstetricians.
- Degree of utilization of Ph.D.'s as research personnel.

The list might be lengthened from existing information, but a more useful list would emerge from an in-depth study of the actual status of academic obstetrics, and especially of the differentials among departments and centers.

With respect to such factors, my very small sample of obstetrics departments showed no necessary correlation between academic quality and patient load, although very large patient loads clearly pose problems. The number of hard-money positions tends to be low in relation to disciplinary objectives, but more careful study would be required to say whether there is an inequity in institutional terms.

Likewise, research space is more restricted than might be desired, but strongly motivated research groups in obstetrics appear able to get their share of the institutional pot. Some departments and schools definitely emphasize research in obstetrics, but the generality of this is strongly in need of further study. Young obstetricians interested in academic medicine clearly must make financial sacrifices, and uncertainties about research support exert a strong bias on their thinking. While research-oriented academic centers are incorporating Ph.D.'s into their obstetrical programs, there is variability in the degree of stability of employment assured.

I emphasize again that this impressionistic statement is based on a very limited sample. It badly needs to be tested against broader and more reliable data. Nonetheless, I am prepared to make the following recommendation for consideration:

Either the conference itself should evaluate the present relative status of academic obstetrics or, more feasibly, it should recommend a longer-term study that may provide such an evaluation. The impression that obstetrics is low on the totem pole of academic medicine persists, but there are indications that the situ-

ation is changing at certain centers. Documentation of the actual current status is essential if any effective steps are to be taken to influence it.

There is an important question beyond the issue of current status. Are the objectives and purview of obstetrics, as now defined, optimal? Certainly the purview has altered and widened in recent years. In the process the traditional discipline of obstetrics and gynecology has spawned three subspecialties: gynecological oncology, reproductive medicine, and fetal medicine. The last two represent a branching of traditional obstetrics: reproductive medicine focuses on gametes, fertilization, implantation, and the maternal aspects of pregnancy; fetal medicine concentrates on the developing component of the maternal-fetal unit. Of the two, reproductive medicine has had by far the greater attention, thanks to the practical problems of fertility, abortion, contraception, and sterility. There is, however, growing opportunity and a need for increased activity in the area of fetal medicine—a matter to which I will now turn.

By way of historical reference we may note that obstetrics owes its existence to an evolutionary decision eons ago. Higher vertebrates came to rely on internal fertilization and development. Apart from creating a medical discipline, that momentous decision has kept early human development an underdeveloped area of biological knowledge. The beginnings of our individual existence literally occur in a black box that is figuratively a cloister, completely protecting its contents from harm. A number of factors now have combined to penetrate the black box and to dispel the notion that it is an impregnable shelter. In response to clinical necessity fetal medicine has begun to emerge, but with a still quite narrow focus in comparison to the scope that recent biological advances foreshadow.

Let me first list some of the factors that have brought the fetus to center stage. First, its vulnerability to external insult, whether physical, chemical, or biological, has been all too vividly demonstrated. Ionizing radiation is teratogenic, and the uterus is penetrated by it as easily as any other tissue. Various chemical toxigens freely pass the placental barrier. In the case of alcohol

and various drugs, the mother often is not only not an obstacle but actually may function as a funnel to increase fetal exposure. Generally speaking, the fetus, as compared to later stages, is more sensitive and more drastically affected at critical times by chemical toxigens. The developing fetus, over time, also often scales up relatively small initial effects into incapacitating or lethal disorders in later life. This is dramatically evident in what is being learned about the effect of slow viruses and autoimmune reactions in initiating pathogenesis in utero. Especially of concern is the vulnerability of the fetal brain, with all the later problems even minimal dysfunction can produce.

Second, the fetus has literally been brought into the open at either end of its physically cloistered, intrauterine existence. Life support has proved effective, with greater and greater degrees of prematurity, back to the beginnings of the third trimester. The late-stage fetus ex utero is now common in intensive care units and affords a whole new perspective on the requirements for healthy early life and the possible long-term iatrogenic effects of fetal lifesaving. At the other end of gestation, the recent achievement of external human fertilization, with development in vitro to reimplantable stages, opens a window not only for observation but conceivably for experimental manipulation. Although many complications, especially ethical and social, remain to be resolved, the beginnings of human development are now potentially accessible to deeper understanding. No one familiar with new techniques for the study of nonhuman mammalian embryos will fail to recognize their potential applicability to comparable human stages. Twinning, cloning, embryo fusion, and direct genetic intervention applied to human embryos are all on the social agenda for discussion, even if not yet major objectives, scientifically or clinically.

Third, the intervening period that is still inside the black box is also being probed. Fetal monitoring in utero now has several major modalities: fetoscopy, ultrasonography, amniocentesis, and analysis of both fetal and maternal fluids. The picture of the fetus that emerges from these techniques is still fragmen-

tary and often crude, but there is at least a picture instead of a blank wall.

Fourth, cell and molecular biology are rapidly building new conceptual and technical approaches to the understanding of the important developmental period between the zygote and the early fetus; this period is the province of mammalian embryology. Within it lie the mechanisms of transcription, translation, and elaboration of the relative simplicities of DNA sequence into cellular and multicellular behaviors, and then, through differentiating and organogenesis, into the enormous complexities of even an early human fetus. Much that is now known of these fundamental developmental mechanisms comes from studies of organisms ranging from bacteria to nonprimate mammals.

The integration into medicine of the rapidly expanding developmental knowledge will of course occur through many channels. Medicine, pathology, and, especially, pediatrics have already been obviously affected. But these disciplines do not specifically focus on mechanisms of embryogenesis and organogenesis, the predecessor steps to fully mature function. In fact the mechanisms of these processes receive minimal attention in medical curricula today, despite the fact that, as developmental mechanisms, they lay the foundation for both health and disease. The responsibility for transfer to the clinical arena of new knowledge in this area can and should be assumed by fetal medicine.

Special note should be taken of progress in developmental neurobiology. The clinical incidence of disorders of neurological development is high—at the 10 percent level among American children. Learning handicaps are estimated at 75-240 per 1,000, and seizures occur at a rate of 50 per 1,000. Hearing deficits, cerebral palsy, mental retardation, spina bifida, and infantile autism aggregate to another 11-17 per 1,000. The precise etiology of these conditions is generally obscure, but attention legitimately focuses on the dramatic enlargement of the brain that occurs in the second half of pregnancy. At birth the brain has reached one-third of its mature weight and almost all of its total neuronal complement (2×10^{11}) has been formed. It should not be sur-

prising that during maximal growth and differentiation of the brain it is especially sensitive to unfavorable circumstances, whether due to anoxia, infections, toxins, physical effects, or genetic defects. There is of course no organ that merits more complete understanding and more guardianship than the human brain.

To add embryogenesis, organogenesis, and, especially, neurogenesis to the intellectual base of obstetrics requires the deliberate projection of fetal medicine back to the earliest stages of development. It would thus overlap reproductive medicine in the period up to the time of implantation. In these terms, fetal medicine would be a major segment of developmental medicine, a still broader perspective shared with pediatrics and geriatrics. Perinatology and neonatology have already become points of overlap of obstetrics and pediatrics. Obstetrics, in the older and narrower sense—management of pregnancy, labor, and the puerperium—would thereby become a subspecialty, along with reproductive medicine and fetal medicine, in a new, encompassing, and challenging major discipline. In intellectual terms the discipline might be said to encompass medical epigenetics.

Whatever its title, the expanded discipline would continue to regard pregnancy and the birth process as central to its clinical purview, but would examine them in the intellectual perspective of the broad continuum of reproduction and development. Obstetrics would continue to organize health care, centering on the pregnant woman; reproductive medicine would increasingly deal with all clinical aspects of fertility, sterility, and sexuality; while fetal medicine would focus clinically on the health of the fetus as prophylaxis for many of the disorders diagnosed and treated therapeutically by pediatrics and even adult medicine. With a range of this kind, the broad disciplines of reproductive and epigenetic medicine would have the solid intellectual base required for status at the top of the academic totem pole.

Such a concept obviously would involve some jostling and trade-offs with other disciplines. Gynecological surgery, including oncology, but excluding parturition itself, might return to its parental discipline, since it has little reason to stand separately

from surgical, radiation, and medical oncology. Moreover it makes more sense to include both males and females in reproductive medicine, making gynecology an anachronism as a general approach to medical problems. Urology and nephrology could be divested of sexist orientation, with attention given equally to men and women.

All these changes would represent healthy boundary straightening among disciplines in the interest of a more rational medical organization. I am not so naive, however, as to believe that the sweet voice of reason can immediately command such changes.

This leads to my final point. I suggested earlier that academic medical disciplines necessarily must first be defined clinically, but that they also profit from an identifiable intellectual base. With the ever greater rational and scientific foundation for medical practice, the relative importance of the intellectual factor moves up with respect to the clinical one. A transformation of obstetrics and gynecology into reproductive and developmental medicine would be in harmony with this trend; in fact the transformation is already in process as part of the trend. One mark of the transformation is the appearance of Ph.D.'s as at least quasi members of "oasis departments." Given my own background, I have special interest in this development and believe it deserves special attention. The issues involved are complex, however, and I have no intention of exploring them in depth here. I will limit myself to several points that seem to me to be relevant to the preceding discussion.

• The long preparation required for specialty medical practice—for reproductive medicine, for example—makes this an impractical track for producing all academic clinical researchers. Moreover, once produced, such physician-researchers have great difficulty in sequestering sufficient time for effective research without extensive collaboration.

• Ph.D.'s with suitable research training are attracted to medically related areas when these areas have the intellectual challenge of reproductive and developmental medicine. For example, a recent study of the staff of mental retardation research centers supported by the National Institute of Child Health and

Human Development showed a ratio of 10:6:1 among Ph.D.'s, M.D.'s and M.D.-Ph.D.'s. Given the currently expanding postdoctoral pool of Ph.D.'s in the biomedical sciences, and the declining undergraduate enrollments expected in higher education during the coming decade, greater involvement of Ph.D.'s in academic medical departments warrants careful consideration.

• There are conceivable advantages to reducing the segregation of Ph.D.'s in basic science departments of academic medical centers. This is a particularly controversial matter, and I confine myself to the observation that in a number of instances, radiation physics, for example, Ph.D.'s function directly at the clinical firing line and are effectively based in so-called clinical departments. The multiperson application of expertise that characterizes much of modern medicine is best carried out in administrative units that accommodate differing academic backgrounds to specific objectives. The closer academic medicine can come to this objective, the less will be the tendency for practitioners to fragment health care in the "real world."

To conclude, my impression is that what has been called academic obstetrics stands on a threshold of potential transformation. If available opportunities are seized it can emerge as a new and broadened discipline oriented toward early human development, and it will command a position at the very top of the academic totem pole.

A Pediatrician's View

Henry L. Barnett

My credentials for daring to discuss the current status of academic obstetrics before this group need to be described and examined. At the beginning of my career in pediatrics, almost forty years ago, I would have been considered not only as an

outsider, but as an enemy. At that time at Washington University School of Medicine in St. Louis, and in many other medical colleges throughout the country, there was strong and sometimes bitter competition between departments of obstetrics and pediatrics over who should care for newborn infants. I recall that between 1868 and 1919 the title of what is now the *American Journal of Obstetrics and Gynecology* was the *American Journal of Obstetrics and the Diseases of Women and Children*. This early struggle for control of the nurseries created a serious obstacle to the academic development of both departments. Fortunately the problem is being resolved, although, as I shall discuss later, a new aspect of it has emerged.

My credentials, then, are those of a pediatrician whose professional career has been spent in academic pediatrics and whose research has been in two areas: developmental renal physiology and, more recently, clinical epidemiology of renal disease. Finally, I have been involved with the academic societies of both pediatrics and internal medicine, and several of my comments will concern how the academic development of these two disciplines may relate to the current status and future development of academic obstetrics.

In preparation for this conference I made visits to four departments of obstetrics and gynecology in New York and one in Philadelphia. I am well aware that visiting five departments does not in any way permit generalizations about the character of departments of obstetrics and gynecology in the United States. Fortunately, however, the five departments were in various stages of development, and from discussions with the chairmen and some of the staff I did get some sense of what they consider to be their accomplishments, as well as their weaknesses and major concerns. Although Grobstein and I prepared our presentations independently and approached our assignments from very different professional backgrounds, it is interesting, though not unexpected, that our impressions are similar. Accordingly, I will limit my remarks to the following three propositions:

• There are messages from the development of academic departments of internal medicine and pediatrics that could be

useful in considering the academic status of departments of obstetrics and gynecology.

• There are today academic departments of obstetrics and gynecology that apparently either got this message prematurely or, more likely, conceived the idea independently; these departments may serve as models for the academic development of others.

• There is a need to redefine the boundaries of age-dependent research in obstetrics and pediatrics along rational developmental lines.

Let me first define the sense in which the term academic is used here, as applied to a clinical department in a medical school. Most would agree that in this context the word connotes teaching, research, and patient care, although some prominent medical academicians would be willing to reduce the time they devote to teaching and eliminate many aspects of patient care from their activities. I disagree strongly with this trend in academic medicine. Nevertheless it appears that in the departments of obstetrics and gynecology I visited, and in others I have known, patient care and to a lesser extent teaching have been relatively well developed, and that, during the past twenty-five years, research is the academic component that has not kept pace with departments of internal medicine and pediatrics. Let me therefore confine the arguments supporting my propositions to the research component of academic obstetrics, and ask you to consider them as they apply to tertiary care academic centers.

First, are there messages from the development of academic departments of internal medicine and pediatrics that could be useful in considering the academic status of departments of obstetrics and gynecology? I believe there are, but I do *not* believe this should be interpreted to mean that future academic development in obstetrics and gynecology should recapitulate the forms taken in internal medicine and pediatrics. Extensive postdoctoral research programs in clinical departments were developed and generously supported shortly after the end of World War II. The model at that time was for individuals completing their residencies to take two to three years of research training

at the National Institutes of Health or at other scientific institutions in order to prepare for careers as academic clinical scientists. The resulting productivity of many of these investigators, especially in internal medicine, has been impressive. A considerable number have been able, as individuals, to bridge basic biomedical science with clinical investigation and to make fundamental contributions to both fields.

Unfortunately, in some departments in which these programs were most successful clinical care of patients and teaching of clinical medicine to students and residents suffered. Nevertheless there emerged many of the present leaders in academic internal medicine, and to a lesser extent in pediatrics, who do excellent, often quite basic, research, and at the same time continue to function as accomplished clinicians and clinical teachers. There are similar, although apparently fewer, clinical scientists in obstetrics, and even fewer in surgery and its specialties. I do not intend to discuss here the reasons for this situation. They stem from differences in how members of these academic disciplines conceptualize their major tasks—in a sense, medical versus surgical; from different economic gradients between those in academic positions and those in practice; and from many other factors that will undoubtedly be discussed during this conference. My question here is whether future major advances in research in obstetrics or in other clinical disciplines will follow the paths taken by internal medical and pediatrics during the last twenty-five years.

I believe not. As impressive and productive as many of the leaders in these academic clinical departments are, and again I do not underestimate them, the time is approaching, if it has not already arrived, when the important research questions in clinical departments will require collaborative research among true professionals from several disciplines: basic scientists, both biomedical and biosocial, scientifically oriented clinicians, and future clinical scientists whose postresidency research training specifically bridges the work of the other two groups. I hope that distinction is clear: it is between a clinical scientist who applies a basic science to clinical problems and one who, also as a professional, serves to link the work of the professional basic scientist with that of the equally

professional clinician. My reason for this belief is simple: both clinical medicine and basic biomedical and biosocial sciences have become so complex that even the "best and the brightest" of individuals cannot provide in both areas the kind of professionalism required for future advances.

My second proposition is that departments of obstetrics and gynecology could serve as models for future academic development, not only of departments of obstetrics and gynecology but of all clinical disciplines. To suggest that those in obstetrics and gynecology received their messages from departments of internal medicine or pediatrics is probably presumptuous, since they appear to have developed de novo at the time independent clinical scientists were dominating the other clinical departments. In two of the five departments visited—the two most established—there were large and productive multidisciplinary research groups that included many basic scientists, especially in the subspecialties of reproductive medicine and gynecological oncology. There were also extensive collaborative programs in fetal medicine with such departments as pediatrics, anesthesiology, pharmacology, and genetics. In two other departments the chairmen had assumed their positions relatively recently, but their planning appeared to be in directions similar to the first two; the fifth department was in a period of transition.

I had several discussions with basic scientists working in departments of obstetrics and gynecology. Most of them had Ph.D. degrees and held joint appointments in their own preclinical departments and in obstetrics and gynecology. They believed that if there were sufficient numbers of them (critical masses), even if they were from different basic science disciplines, their research interests and accomplishments were fulfilled more completely by their physical presence in the department of obstetrics and gynecology than if they attempted similar collaborative research while working in their parent preclinical departments. It appears that the research interests of the major members of many preclinical departments, and the resulting scientific climate, are less and less related to clinical science. Arguments can be advanced on both sides of the question as to whether or not this tendency is healthy

for medical colleges. Whatever the answer, a major requirement for the future development of academic clinical departments is that preclinical departments not exclude scientists whose interests are in clinical science, wherever they may be working.

The existence of close collaboration with pediatrics and other disciplines in research in fetal medicine in the two well-established departments could also serve as a model for the future. This aspect of academic obstetrics and gynecology brings me to my third and last proposition: the need to redefine the boundaries of age-dependent research in obstetrics and pediatrics along rational developmental lines.

There were two destructive and, in a way, tragic results stemming from the pediatrician's political victory in gaining responsibility for the newborn. First, with little or no contact with newborns after delivery, the obstetrician's interest in the newborn, and consequently in the fetus, was diminished. As a result the development of research on fetal medicine by obstetricians was delayed. Second, as shown in Figure 1, it led, or forced, pediatricians to study newborns as if development began at birth. With this concept, both clinical concerns and research in pediatrics focused on the status of the infant at birth and later in its development, especially during infancy, since such studies can be made most readily during periods of rapid change.

As shown in Figure 2, however, human development is a circle and the choice of a starting point is arbitrary. A rational one for our mutual interests, which may permit effective intervention for improving the health of the next generation, would be during the adolescence of the parents. From here, current knowledge and future research questions about genetics, teratology, psychology, and sociology could be applied to premarital and preconceptual counseling. In addition, present and future knowledge about fetal, perinatal, and neonatal influences on development would contribute to the health of the fetus, the newborn, the infant and child, the future adolescents, and ultimately to the parents of the next generation.

I mentioned earlier the mistake of having the pediatrician "own" the newborn infant. It would be equally destructive scien-

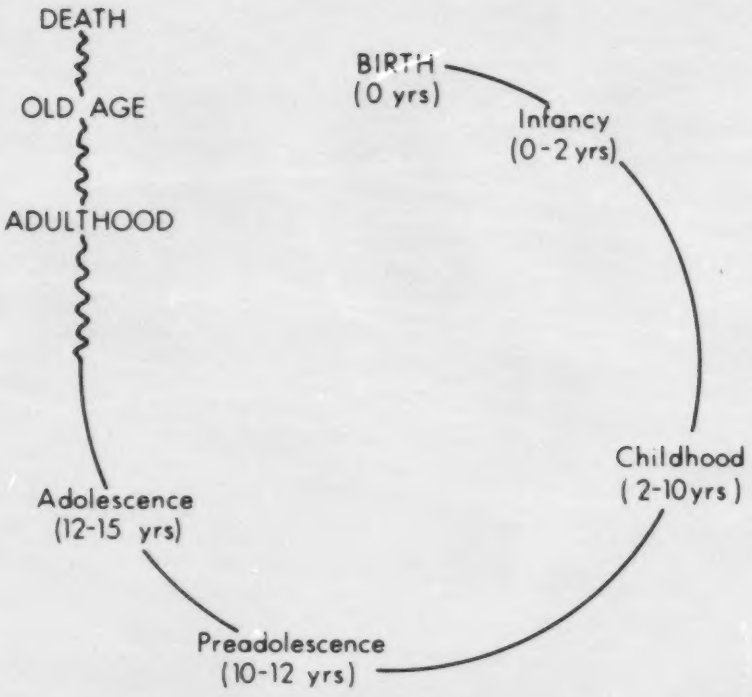

Figure 1. Schema depicting human development as beginning at birth and ending at death.

tifically to now have a perinatologist "own" the fetus and newborn. Unfortunately this movement has begun in a few institutions. In contrast, and without disturbing existing departmental structures, functions, or prejudices, I believe productive research in the future requires collaborative teams of scientifically oriented clinical obstetricians and pediatricians, biomedical and biosocial scientists, and, finally, clinical scientists able to link these and perhaps other professionals. In my brief look at only a few departments of obstetrics and gynecology I observed some that could serve as models for the future development, not only of other academic departments of obstetrics and gynecology but of academic depart-

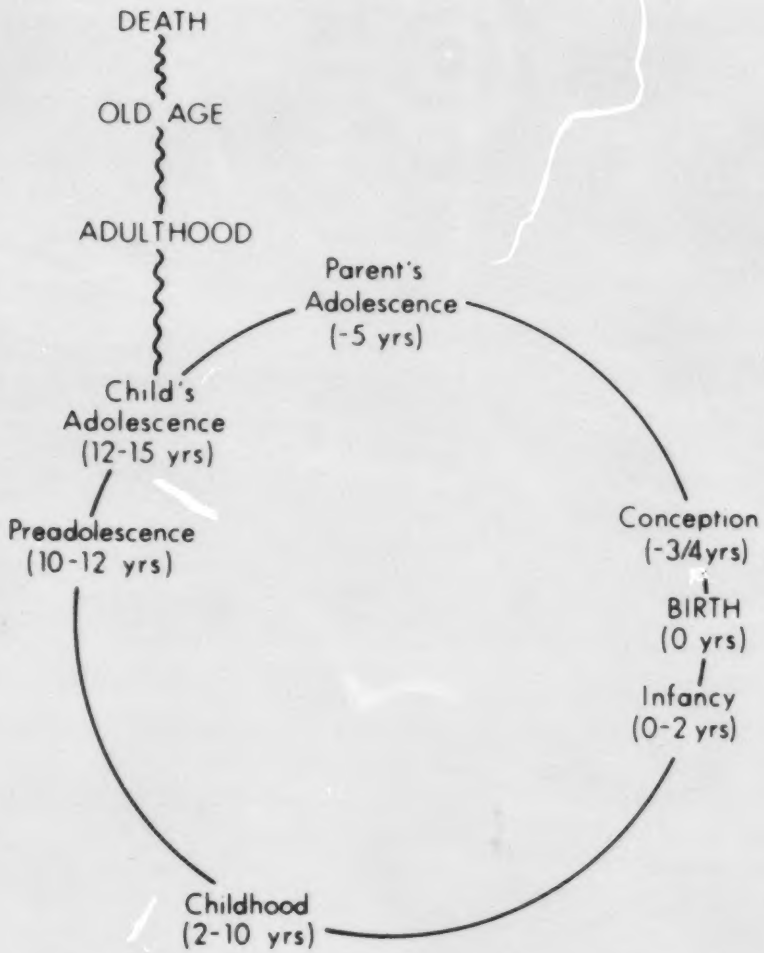

Figure 2. Schema depicting human development as a circle, with adolescence selected arbitrarily as a starting point.

ments of other disciplines, clinical and preclinical, that I believe must be involved with them.

EPILOGUE

As an epilogue let me say that I have shown this paper to and discussed it with two individuals and one group before presenting it here. A brief description of their reactions might serve to avoid some misunderstandings in our present discussions. The first person was Norman Kretchmer, who agreed with most of my opinions and thought that, among the many aspects of the subject that could have been discussed, the ones selected were pertinent. The second person was a child psychiatrist who has taught me a great deal about the psychological aspects of pediatrics. He believed I had underemphasized the psychological aspects. For reasons that might be worth including in our discussions here, however, he thought he knew why I had intended to skirt them. Of greatest interest was the response of a group of pediatricians, most of whom were involved primarily in patient care rather than research. They interpreted—or rather misinterpreted—my propositions to mean I was recommending that pediatricians give back the care of the newborn—and also care of the adolescent—to some other clinical specialist. They were threatened by this thought since they hold, with some justification, that among obstetricians and gynecologists, internists, and pediatricians, only the pediatricians understand comprehensive health care of mothers, infants, children, and adolescents, especially their psychological needs.

My purpose in adding this epilogue is to emphasize that I have not been discussing clinical practices in primary care, which is not our subject today. I want to reemphasize that what I have discussed here are some aspects of research on adolescents as potential mothers, on pregnant women, on fetuses, and on newborns, and, when needed, on their tertiary care in academic departments of medical schools.

Discussant:

Harry Prystowsky

By way of introduction permit me to make a single observation: it is a healthy sign for an academic discipline to concern itself with its future direction, and, in so doing, to place heavy emphasis on its scholarly contributions.

The two distinguished speakers have covered wide areas for future consideration. I have no real disagreements, but I would like to present some specifics for your consideration. For I have found during the past six years that certain elements are almost essential for change; otherwise recommendations fall on deaf ears. More important, time is wasted.

Colleges of medicine are *not* in a state of confusion. The people who administer them are human and quite wise; the faculty accepts its traditional role in patient care, education, and research; and the students are solid, quite capable individuals.

The observation I would make is that there has been a shifting of priorities: patient care and teaching have put research aside at the moment—not in all departments, but certainly in some.

There is clearly a major deficit, however, and it involves every clinical discipline—the clinician-scientist. I refer to that individual who completes his residency, has a meaningful basic science experience, and then joins a faculty of medicine. The point to be made here is that the department of obstetrics and gynecology is not alone; the competition is intense for such persons.

My next point is that in the future the student pool for such a career is apt to shrink, thus compounding the problem. It is my observation that the students' priority is patient care; and they also have developed large fiscal debts while accomplishing their educational goals.

Accordingly, I believe it will be some years before such clinician-scientists emerge in meaningful numbers. Obstetrics and gynecology is going to be just as affected as medicine, pediatrics, and other disciplines.

Another observation I would make is that basic science departments are perfectly willing to participate with their clinical colleagues, provided they gain an advantage. I do not criticize persons who concern themselves with their own careers, their own goals, and their ultimate survival in promotion/tenure ordeals. Many of my colleagues have participated and have gained, but I wonder whether here, also, there will be a retrenchment in numbers who will participate effectively.

I believe the above two considerations are the most critical—they point to the heart of the matter. Stated in other words: faculty talent! And, once they are in hand, permit them to grow and develop.

This brings me to the next point. Chairmen of academic departments have a considerable role, not only in recruiting but in developing such faculty. Their performances are not balanced; there is great variability. Some do the job well, some do not. My next point is: the grit of the chairman of the department is essential if obstetrics and gynecology is to move ahead.

I shall make only a passing comment about space, curriculum, new organizational structure, etc. They are all important, but I believe they are secondary *now*. Department heads have spent many years dealing with such important matters, and now they are in place (they ought never be too rigid) we come back to the basic and critical factor—faculty talent to implement all of these lovely projections. (I would remind you that people develop programs, not committees.)

I really do not know whether obstetrics and gynecology ought be at the top of anybody's totem pole. I believe, perhaps with bias, that it has come along quite well. Granted that I have not been active in the discipline for six years, I see no need to apologize for the performance of obstetrics and gynecology. It has grown in stature, and I expect it to develop even further. Need for improvement and/or expansion, yes—that is the fun of the academic ballgame.

Finally, I rather enjoy the comments made about models. Here, to my way of thinking, there is danger in generalization. I believe strongly in diversification at the level of schools, depart-

ments, and faculty. Further, I feel this way as it relates to universities. Vigorous, active units that deal with local matters on the local scene and develop their own personalities will emerge as strong as a national committee's view of their global role; moreover, they are apt to be more viable in the long run.

In conclusion, I come back to one central point—the need for the triple-threat faculty member. He or she ought be very comfortable and happy doing patient care, teaching, and research. This is the key individual in my formula for the academic growth of obstetrics and gynecology. And it is time for departmental chairmen to get off their ego trips as essential administrators and focus their efforts on the acquisition, growth, and development of such individuals.

SUPPORT OF ACADEMIC OBSTETRICS:

The Public Sector

Norman Kretchmer

Federal funding of research in academic departments of obstetrics and gynecology in the United States has never been substantial, and the situation is no different today. Figure 1 indicates the amount of such federal support for fiscal year 1978–79.

• The Department of State, through its Agency for International Development (AID), provided about $1.6 million for four population research projects relating to fertility regulation.

• The Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) provided about $500,000 to five departments of obstetrics and gynecology for investigations on the effects of drugs such as marijuana, cocaine, and hashish on the fetus.

OFFICE OF MATERNAL AND CHILD HEALTH

• The contribution of the Office of Maternal and Child Health (MCH) of the Health Services Administration (HSA) amounted to approximately $400,000.

The primary purpose of the MCH, which has a total budget of $371 million, is to support service programs such as prenatal and family planning clinics, and the women's, infants', and children's (WIC) feeding program. Its total research budget is small—only 5.3 million in fiscal year 1978.

The MCH grants program awards funds for applied research; it does not support basic research. Findings from MCH-supported investigations are expected to have immediate potential for appli-

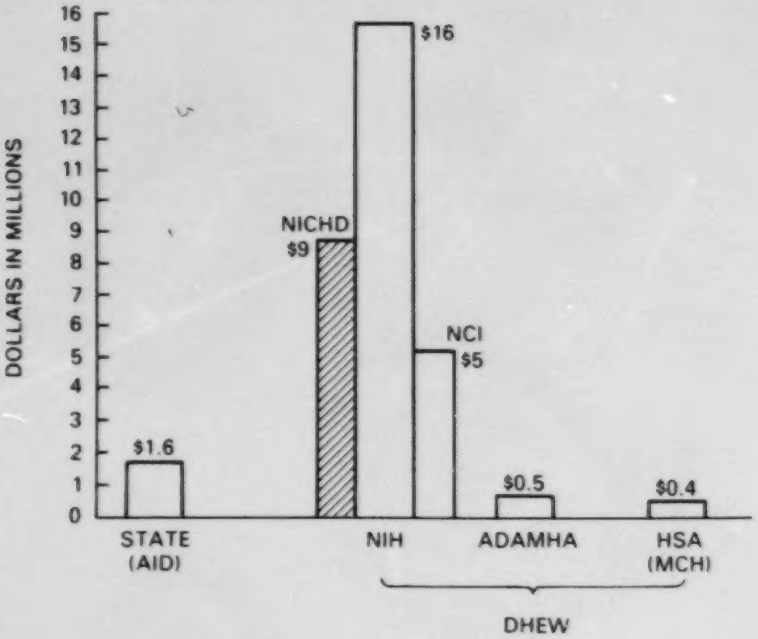

Figure 1. Federal support for research in departments of obstetrics and gynecology in the United States, fiscal year 1978–79. (See text for details.)

cation to health care programs for mothers and children. The standing priorities relating to obstetrics and gynecology include provision of health care to mothers and infants; special needs of high-risk mothers and infants; adolescent health; nutrition; prenatal screening; and dissemination of research findings. Current areas of special attention, particularly relating to the perinatal period, include assessment of the value of new techniques as they are introduced into neonatal intensive care units, and the processes of informed consent, genetic counseling, and psychological support in prenatal and neonatal screening for genetic and birth-acquired conditions.

The MCH currently supports only five such projects in departments of obstetrics and gynecology, which account for its entire allocation of $400,000.

Most of these projects involve evaluations of perinatal services or perinatal programs. Examples include a study of the effectiveness of two experimental education programs: one to reduce repeat pregnancy rates, and the other to investigate the prevalence of sexually transmitted disease in three teenage populations; and a study to assess the effectiveness of two conditioning techniques used to modify fear, pain, and anxiety associated with labor in natural childbirth.

Two other current MCH projects are concerned with the methods used in the practice of obstetrics and gynecology—in one case, urinary urea nitrogen as a tool to survey protein intake in pregnant women as it relates to immediate outcome of pregnancy; and, in the other, maternal serum levels of alpha fetoprotein as a predictor of neural tube defects in utero. These studies are clearly of an applied nature.

The MCH does not at this time support any training programs in departments of obstetrics and gynecology, even though it has a training budget of $25 million.

NATIONAL INSTITUTES OF HEALTH

• As indicated in Figure 1, the National Institutes of Health (NIH) provides the greatest amount of research support to departments of obstetrics and gynecology—about $16 million in fiscal year 1978. A survey of NIH funding of these departments demonstrates that it increased by a little more than twofold from 1968 to 1978: in 1968 the total was about $7 million. In terms of real purchasing power of the dollar, adjusted for inflation, the amount has held about even (Figure 2).

NIH support to departments of obstetrics and gynecology in fiscal year 1978 needs to be considered within the context of its total research budget, however. Figure 3 shows it to be 0.7 percent; the percentage going to departments of pediatrics was 3.1; and to departments of internal medicine, 5.4. It is important to note that these three departments received only 9.2 percent of the total, indicating that NIH support is broad-gauge, across many departments and disciplines.

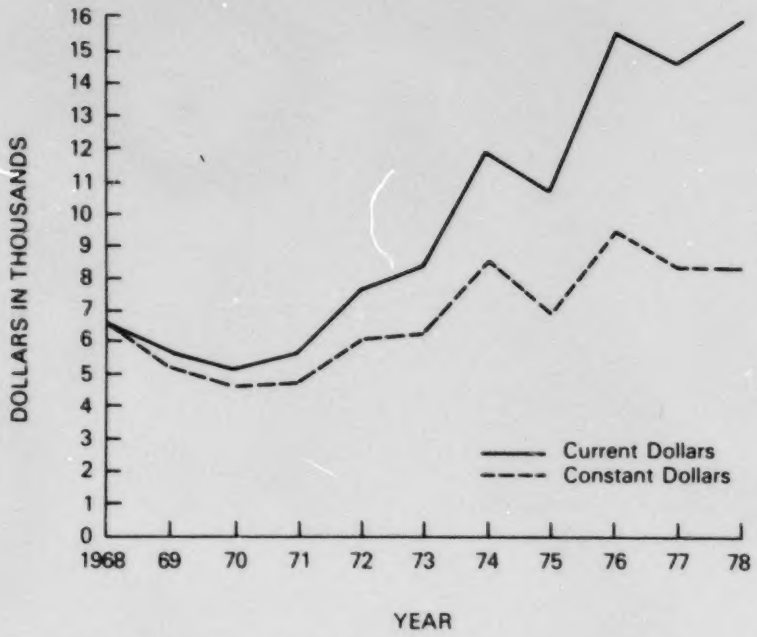

Figure 2. National Institutes of Health support of departments of obstetrics and gynecology in the United States in current and constant (1968) dollars.

INSTITUTES WITHIN THE NIH

• Within the NIH the National Institute of Child Health and Human Development (NICHD) and the National Cancer Institute (NCI) provide the greatest amount of research support to departments of obstetrics and gynecology: for fiscal year 1978 the NICHD contributed almost $9 million, and the NCI almost $5 million.

These figures need to be compared with the total budget for each institute: for that year the NICHD's total extramural (grants and contracts) outlay was almost $137 million, while that of the NCI was close to $630 million. Thus a greater proportion of NICHD funds were expended. Moreover, the NCI, which has a broader mandate than the NICHD, may support demonstration

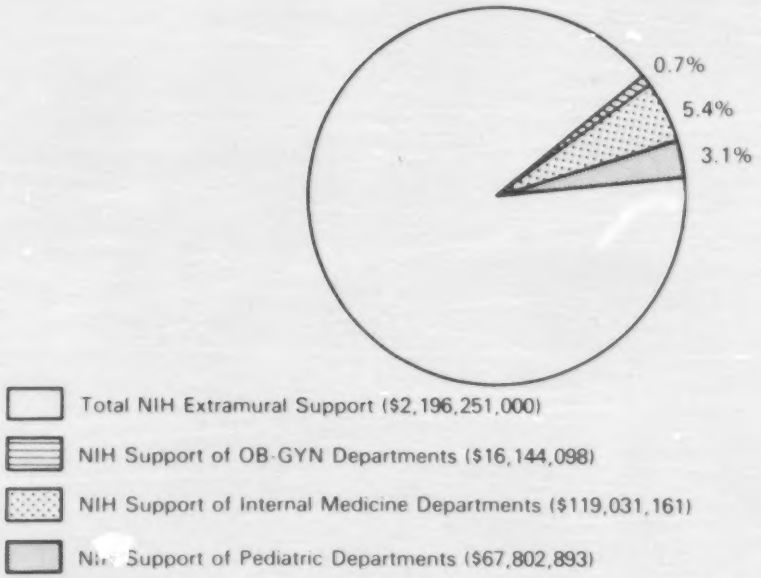

Figure 3. National Institutes of Health support to selected medical school departments in the United States, fiscal year 1978–79.

projects as well as research in departments of obstetrics and gynecology, whereas the NICHD supports "pure" research.

Table 1 shows the amounts that institutes within the NIH contributed in fiscal year 1978, and indicates how this support has changed since 1968:

- NICHD funds have almost doubled.
- NCI support has increased sixfold.
- Funding from the National Heart, Lung, and Blood Institute (NHLBI) has more than doubled.
- The contribution of the National Institute of Arthritis, Metabolism, and Digestive Diseases (NIAMDD) has remained fairly even—in real purchasing power it has actually declined.
- Almost negligible support has been forthcoming from the National Institute of General Medical Sciences (NIGMS) and the National Institute of Neurological and Communicative Disorders

TABLE 1. SUPPORT OF DEPARTMENTS OF OBSTETRICS AND GYNECOLOGY BY THE NATIONAL INSTITUTES OF HEALTH, FISCAL YEARS 1968 AND 1978

Institute	Fiscal Year 1968	Fiscal Year 1978
Child Health and Human Development	$4,793,336	$8,977,923
Cancer	823,276	4,997,132
Heart, Lung, and Blood	213,314	451,276
Aging	—	448,292
Arthritis, Metabolism, and Digestive Diseases	898,441	930,580
Dental Research	16,000	187,040
Fogarty International Center	10,661	77,541
General Medical Sciences	73,265	59,114
Neurological and Communicative Disorders and Stroke	—	15,200
Allergy and Infectious Diseases	—	—
Division of Research Resources	120,031	—
Total NIH support	$6,948,324	$16,144,098

and Stroke (NINCDS), and none from the National Institute of Allergy and Infectious Diseases (NIAID).

- It is of interest that funds from the new National Institute on Aging (NIA), formerly a part of the NICHD, is at a level of $448,292, about equal to that of the NHLBI.
- Over the decade, total NIH support for academic obstetrics and gynecology has more than doubled.

CONTENT OF RESEARCH SUPPORTED

The values shown in Table 1 for the NIH and its component institutes include both basic and applied studies. The NHLBI, like the NCI, has a broader mandate than the others, so it also funds demonstration and control projects in addition to research.

Projects sponsored by the various institutes differ in content: studies supported by the NCI, for example relate to oncology in obstetrics and gynecology; those in which the NHLBI is involved relate to the effects on pregnancy of maternal heart, lung, and blood conditions such as hypertension, sickle cell anemia, and cardiac disease; those funded by the NIA relate to menopause and gynecological problems of the elderly.

So far this presentation has concentrated on support to de-

partments of obstetrics and gynecology, but, in order to give a clearer picture of NIH concerns for the discipline, it is necessary to explore *areas of research pursuit*.

Funds spent on NIH research in the *reproductive sciences* in fiscal year 1978 ($64 million) are shown in Table 2. For present purposes, reproductive sciences include studies on contraceptive development and evaluation, and basic studies on reproductive processes, including, for example, endocrinology, neuroendocrinology, and sperm and zygote development. The studies in the table include both human and animal investigations. The table also demonstrates that the NICHD, at a level of almost $50 million, contributes far more to the reproductive sciences than any other NIH agency.

Table 3 shows NIH research support in the *perinatal area* for the same period. For present purposes, perinatal includes pregnancy, the birth process, and the twenty-four-hour period after birth. Both human and animal studies directly related to problems during this period of life are included in the figures, as are all studies of the embryo and fetus.

The table indicates that for fiscal year 1978 total NIH support in the perinatal area was close to $97 million. Again, the NICHD, at a level of $34 million, leads the other institutes in funding.

TABLE 2. SUPPORT OF THE REPRODUCTIVE SCIENCES BY THE NATIONAL INSTITUTES OF HEALTH, FISCAL YEAR 1978–79
(IN THOUSANDS OF DOLLARS)

Institute	Intramural Funds	Extramural Funds	Total
Child Health and Human Development	$6,425	$43,573	$49,998
Division of Research Resources	—	5,168	5,168
Arthritis, Metabolism, and Digestive Diseases	123	4,068	4,191
Cancer	80	1,515	1,595
Aging	—	1,292	1,292
Environmental Health Sciences	895	—	895
Neurological and Communicative Disorders and Stroke	187	390	577
Heart, Lung, and Blood	—	448	448
General Medical Sciences	—	62	62
Total NIH support	$7,710	$56,516	$64,226

TABLE 3. SUPPORT IN THE PERINATAL AREA (HUMAN AND ANIMAL STUDIES) BY THE NATIONAL INSTITUTES OF HEALTH, FISCAL YEAR 1978–79

Institute	Number of Awards	Amount of Awards
Child Health and Human Development	539	$34,060,699
Cancer	185	15,664,281
Heart, Lung, and Blood	142	10,352,386
Arthritis, Metabolism, and Digestive Diseases	108	7,776,640
Division of Research Resources	151	7,179,177
General Medical Sciences	88	5,827,893
Neurological and Communicative Disorders and Stroke	60	5,361,065
Environmental Health Sciences	46	3,939,110
Allergy and Infectious Diseases	23	2,458,018
Eye	27	1,892,025
Dental Research	31	1,697,516
Aging	12	630,952
Total NIH support	1,412	$96,839,672

In summary, it is clear from Tables 2 and 3 that, while NIH support for departments of obstetrics and gynecology is not great at the present time, its commitment to the *research areas* of importance to the discipline is substantial.

A CLOSER LOOK AT NICHD SUPPORT

It is obvious that within the NIH the NICHD is the focal point for studies relating to obstetrics and gynecology. Figure 4 shows NICHD support of departments of obstetrics and gynecology to be 6.6 percent of its total 1978–79 extramural budget; the percentage going to pediatrics was 14.8. In real purchasing power, however, the funding to departments of obstetrics and gynecology is about at the same level as it was a decade ago (see Figure 2).

Some rather dramatic changes in NICHD support of departments of obstetrics and gynecology, by mechanism—type of support—over the decade 1968–78 are shown in Table 4.

• The number of awards dropped from 142 to 128, while the amount given almost doubled, indicating that the cost of research escalated considerably in that decade.

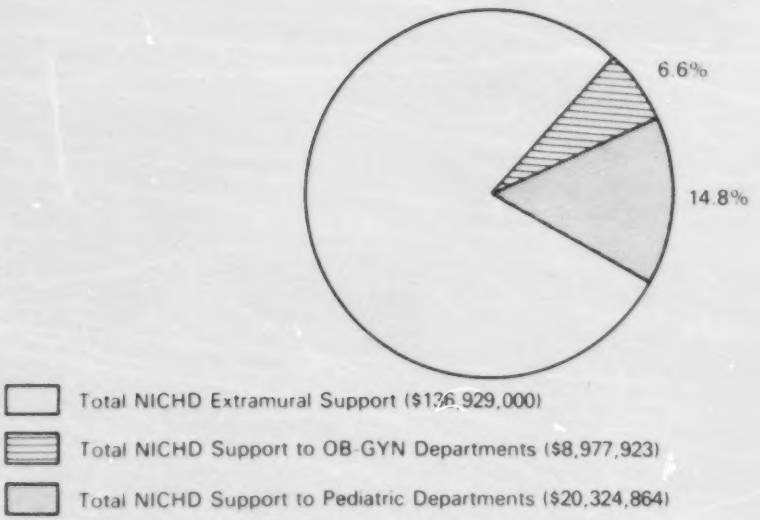
6.6%
14.8%
Total NICHD Extramural Support ($136,929,000)
Total NICHD Support to OB-GYN Departments ($8,977,923)
Total NICHD Support to Pediatric Departments ($20,324,864)

Figure 4. Support of departments of pediatrics and of obstetrics and gynecology in the United States by the National Institute of Child Health and Human Development, fiscal year 1978–79.

• Training grants made to institutions to finance both pre- and postdoctoral training decreased, from almost $1 million to a little over $700,000.

• Research Career Development Awards dropped from about $271,000 to almost $181,000. These awards enable institutions to finance positions for scientists with outstanding research potential.

TABLE 4. SUPPORT OF DEPARTMENTS OF OBSTETRICS AND GYNECOLOGY BY THE NATIONAL INSTITUTE OF CHILD HEALTH AND HUMAN DEVELOPMENT, BY MECHANISM, FISCAL YEARS 1968 AND 1978

Mechanism	Number of Awards 1968	Amount 1968	Number of Awards 1978	Amount 1978
Research grants	98	$2,713,914	83	$5,380,047
Program projects	7	804,087	5	1,676,991
Research contracts	—	—	22	988,896
Training grants	20	978,357	9	705,514
Career development awards	11	271,429	5	180,808
Fellowships	6	25,549	4	45,667
Total NICHD support	142	$4,793,336	128	$8,977,923

• While the amount given for fellowships increased, the number of awards declined from six to four.

This situation must be considered in light of the history of the NIH and the NICHD in supporting training in *all* academic departments. For both training grants and fellowships there has been a general leveling off, and even a slight decrease in funds. If inflation is taken as a factor, an even more stringent overall situation is obvious.

• Support for program projects more than doubled over the decade. These grants are awarded to institutions for long-term research under the direction of an established investigator—usually organized efforts by teams of scientists from various disciplines. In 1968 the NICHD made seven awards totaling about $804,000; in 1978 it supported five projects at a cost of almost $1.7 million.

Two types of program project grants are of particular importance to obstetrics and gynecology: major grants, awarded for multidisciplinary research, permit institutions to conduct comprehensive research on important health problems of children and pregnant women; institutional programs in population research are funded at leading American institutions to establish and maintain interdisciplinary research in population sciences.

• The NICHD awarded no research *contracts* to departments of obstetrics and gynecology in 1968, but in fiscal year 1978 it supported twenty-two projects by contract at a level of almost $1 million.

• The number of research *grants* in departments of obstetrics and gynecology dropped from ninety-eight in 1968 to eighty-three in 1978, but the total funds awarded increased from $2.7 million to almost $5.4 million.

Most NICHD extramural funds are expended in the form of grants to scientists to pursue research projects they have proposed to the institute; other funds are awarded in the form of contracts to scientists to conduct research in areas specified by the institute.

In order to understand NICHD support of departments of obstetrics and gynecology it is necessary to compare it with the institute's support of other academic departments. Table 5 indicates that departments of obstetrics and gynecology have competed

TABLE 5. SUPPORT OF DEPARTMENTS OF OBSTETRICS AND GYNECOLOGY AND OVERALL SUPPORT, BY MECHANISM, BY THE NATIONAL INSTITUTE OF CHILD HEALTH AND HUMAN DEVELOPMENT, FISCAL YEAR 1978–79
(IN THOUSANDS OF DOLLARS)

Mechanism	Support of Departments of Obstetrics and Gynecology		Total Extramural Awards		Percent of Obstetrics and Gynecology Support to Total Extramural	
	Number of Awards	Amount	Number of Awards Overall	Amount Overall	Number of Awards	Amount
Research grants	83	$5,380	1,009	$ 68,758	8	8
Program projects	5	1,676	93	35,541	5	5
Research contracts	22	988	170	20,002	13	5
Training grants	9	705	98	8,398	9	8
Career development awards	5	180	73	2,440	7	7
Fellowships	4	45	137	1,788	3	3
Total NICHD support	128	$8,974	1,580	$136,927	8	7

rather uniformly for contracts, training grants, research grants, etc.; but it is also evident that they are being awarded a very low percentage of NICHD extramural monies.

SUMMARY OF NIH AND NICHD SUPPORT

To summarize the information presented so far, the NIH and, particularly, the NICHD have considerable interest in research in the general areas of obstetrics and gynecology, that is, in perinatology and the reproductive sciences. Yet support to departments of obstetrics and gynecology is minimal, and has been since the NICHD was established.

In an attempt to discover the reasons for this, the staff of the institute has reviewed grant proposals from departments of obstetrics and gynecology that have come to it through the peer review system. Those data are listed in Table 6, which, for 1978, shows the number of proposals received, the number approved by peer reviewers, and those with high enough scores to merit funding. The table also compares these figures with data on departments of pediatrics.

- Departments of obstetrics and gynecology and of pediatrics submitted about the same number of grant applications to the NICHD, but those from the former did not receive high enough priority scores to merit funding.
- Peer reviewers approved a greater number of applications from department of obstetrics and gynecology (73 percent) than from departments of pediatrics (62 percent). For research grants alone, the percentages approved were 65 for obstetrics and gynecology and 60 for pediatrics.
- The proportion of applications from departments of obstetrics and gynecology actually funded, however, was only 23 percent for research grants and 22 percent for all types of grants; for departments of pediatrics the percentages were significantly higher —29 for research and 32 for all others.
- In terms of dollar amounts, the awards to departments of obstetrics and gynecology totaled slightly less than $3 million; those to departments of pediatrics almost $7 million.

TABLE 6. DEPARTMENTS OF OBSTETRICS AND GYNECOLOGY AND OF PEDIATRICS: GRANT APPLICATIONS RECEIVED, APPROVED, AND FUNDED BY THE COUNCIL OF THE NATIONAL INSTITUTE OF CHILD HEALTH AND HUMAN DEVELOPMENT, FISCAL YEAR 1978–79

	Received		Approved		Funded	
	Obstetrics and Gynecology	Pediatrics	Obstetrics and Gynecology	Pediatrics	Obstetrics and Gynecology	Pediatrics
Research grants	165	152	108	92	38	44
(Percent of research grant applications received)	(100)	(100)	(65)	(60)	(23)	(29)
Program projects	8	8	5	7	0	1
Career development awards	5	5	2	4	1	4
Fellowships	5	19	1	13	1	5
Training grants	3	4	2	2	2	1
Total	186	188	118	118	42	55
(Percent of all applications received)	(100)	(100)	(73)	(62)	(22)	(32)
Amount of awards					$2,905,372	$6,881,428

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IS THERE A NEED FOR MORE RESEARCH?

Although the NIH and the NICHD sponsor a great deal of research in perinatology and the reproductive sciences, there is no question that more research is needed, whether funded by the federal government or by other sources. The dimensions of the need for research on pregnancy and infancy are all to apparent when we consider that:

- Seven percent of infants born alive in the United States have a congenital defect; more than half of spontaneous abortions are of severely malformed fetuses.
- Mental retardation afflicts at least one in every 100 Americans.
- Twenty percent of the offspring of diabetic mothers die in infancy.
- Two infants in every 1,000 fall victim to the "sudden infant death" syndrome.

The need is further highlighted by some dimensions of human reproduction in this country:

- One in every five births is unwanted.
- Two million couples who want children cannot have them.
- Twenty percent of all births in 1975 were to teenage mothers, 20 percent of whom were under the age of seventeen.

These are all major public health problems stemming from unmet needs in maternal, fetal, and newborn life. This represents a challenge for biomedical research to find new and better ways to treat, and to prevent, disorders in the perinatal period.

WHAT POSITIVE ACTION HAS BEEN TAKEN?

Recognizing the need for further research to solve the problems of pregnancy and early life, and the fact that departments of obstetrics and gynecology are not competing succesfully for research funds, the NICHD has been, and is, taking action. The NIH, cognizant of more general needs in research support, has also proposed some changes.

These efforts are aimed, first, at stimulating collaboration and cooperation among disciplines and between basic and clinical

scientists, and, second, at training new researchers. The result should be a burgeoning of new research initiatives and innovative ways to approach research questions, with an eventual improvement in the ability of departments of obstetrics and gynecology to compete for scarce research funding.

Over the past few years the NICHD has been stressing the importance of the perinatal concept, that is, that studying the continuum of human development is the best way to solve problems of pregnancy and infancy. Over the past several years the institute has been increasingly successful in bringing pediatricians and obstetrician-gynecologists into contact with other specialists in human development such as psychologists, sociologists, and other behavioral scientists to discuss health issues in these broad terms.

In the last year the NICHD has sponsored a number of small workshops on such topics as fetal assessment, hypoxia in utero, and nutrition; these have served to stimulate researchers and have given us some new initiatives in the area of fetal medicine.

In March 1979 the institute sponsored a Consensus Development Conference on Antenatal Diagnosis that provided an excellent forum for experts in various fields to discuss this topic. The conference produced a number of exciting research ideas and, more important, signaled the beginning of a new relationship between the institute and the field of obstetrics and gynecology. A second conference on cesarian section is being planned.

In the area of research training, some improvements are likely to be seen in the next two years: the NIH has taken action to considerably increase the stipends for both pre- and postdoctoral grants in 1980. In addition a program of senior fellowship awards has been announced. These awards, for individuals with doctoral degrees and at least seven subsequent years of relevant research or professional experience, are designed to provide opportunities for experienced scientists to make major changes in the direction of their careers, to broaden their scientific backgrounds, to acquire new research capabilities, or to expand their knowledge of an allied research field.

The NIH has also announced the availability of a new type of training activity—short-term research training grants—to expose talented students in health profession schools to the opportunities inherent in a research career. This program, which does not carry a pay-back provision and provides for up to three months of training, is designed to ameliorate any future shortage of clinical investigators.

In clinical research the NICHD recently sent to the Congress a report of a study on the feasibility of establishing a clinical research center for pregnancy and infancy. This report, which was requested by the Congress, has not yet been acted upon.

The study determined that: 1) there is a need for research in maternal, fetal, and newborn health problems; 2) there is a commitment by scientists and by the public to improve the health of mothers and of newborns; and 3) there exists a "scientific readiness" for expanded perinatal research. The study demonstrated that there is in the United States a lack of training programs and facilities to produce new clinical investigators in the subspecialties related to maternal, fetal, and perinatal medicine. The report recommended that a study center for pregnancy and infancy be established at a host institution, under the sponsorship of the NICHD.

In conclusion I would like to suggest that the area of perinatal research and departments of obstetrics and gynecology would benefit mutually from more emphasis on training young investigators and on fostering cooperation and collaboration among diverse research areas.

The Private Sector

John Z. Bowers

FORD FOUNDATION

When the Ford Foundation launched its worldwide programs in 1949 the trustees adopted a resolution that there would be no major efforts in relation to medicine. They apparently based this decision on the grounds that other foundations were already investing heavily in medical programs. As a newly activated philanthropy the Ford Foundation sought opportunities in fields that were not receiving support from other similar sources.

In 1959, with the population explosion an issue of growing concern around the world, the foundation appointed a committee headed by Reuben Gustavson, Ph.D., a biochemist and former chancellor of the University of Nebraska, to determine what steps the foundation should take to build a scientific base in reproductive biology for programs in population control. The committee reported that although funds for the limited number of investigators in the field were adequate, there was an urgent need to expand the number of scientists and programs. At that time, total support for reproductive biology from federal and philanthropic sources was estimated to be $900,000.

The foundation adopted the recommendations of the Gustavson Committee and developed a highly effective global program. Nicholson J. Eastman, former professor of obstetrics at the Johns Hopkins University School of Medicine, and Aura E. Severinghaus, former professor of anatomy at Columbia University College of Physicians and Surgeons, were the principal advisors in the formative years. An example of early programs included support for demographic studies at Pennsylvania and Cornell universities (1961); endocrinological studies at the Karolinska Institute in Stockholm (1963); and endocrinological/neuroendocrinological studies at the University of Cambridge, University of California, Los Angeles, and Brown University.

Extensive programs emphasizing training and research in reproductive biology and contraceptive development for both males and females were made possible through Ford Foundation support in America and Europe. In addition, pre- and postdoctoral fellowships were awarded to train over 600 scientists in Europe and the United States.

Efforts in developing countries also received support, the largest and most productive of which was established in India, where the foundation instituted broad programs covering education, agriculture, community development, village health work, and public health administration.

In 1976 the foundation decided to cut back its reproductive biology and contraceptive development programs, and applications were judged in a competitive manner by an International Advisory Committee. Current support is primarily concentrated in foreign laboratories with high research capabilities, such as the Weizmann Institute of Science in Israel, and the Howard Florey Institute of Experimental Physiology and Medicine in Australia.

The Ford Foundation has been, and continues to be, a major supporter of family planning programs through contributions to the Population Council and to the International Committee on Applied Research in Population.

ROCKEFELLER FOUNDATION *

Historically, there was no specific, defined Rockefeller Foundation interest in obstetrics and related fields in the medical school setting. Its programs in the early years were concentrated on issues related to public health, and thus the foundation gave a high degree of attention to midwifery teaching, training, and practice and to maternal and child health, rather than to support of clinical specialties in medical schools.

Research in human reproduction and reproductive biology was funded through the National Academy of Sciences/National Research Council Committee on Research in Problems of Sex, as

* The author wishes to thank John Maier, M.D., former director of the Division of Health and Population of the Rockefeller Foundation, for his cooperation in providing the historical material for this section.

well as through independent grants to universities. Some of this support strengthened the research programs of departments of obstetrics, either directly or indirectly. An example of the latter was the support given to George Corner and Willard Allen in their work on progesterone at the University of Rochester; Allen's work in the field continued throughout his career in academic obstetrics. The objective of these programs was the development of a body of knowledge in the field, although there may have been spinoff effects that contributed to the upgrading of academic obstetrics.

In 1963 the Rockefeller Foundation instituted a new program to study problems associated with population growth arising from continued high fertility rates, particularly in underdeveloped countries. Major emphasis was given to support of basic and applied research in reproductive biology as a means of providing the body of fundamental knowledge necessary for the development of more and better methods of fertility control. Much of this work involved departments of obstetrics in American medical schools, and thus served to strengthen research and training in those departments, although here again this was a spinoff effect rather than a primary objective. The mechanisms included:

• Five-year grants to establish large-scale centers for research on reproductive biology. The grants provided for laboratory operating expenses in both basic sciences and clinical fields, together with funds for postdoctoral and graduate student fellowships, and, on occasion, support of new faculty members. The centers were interdisciplinary in nature, but half the programs were based in departments of obstetrics; of the others, only one did not involve a clinical department.

• Three-year grants established a closer relationship between research in obstetrics and basic reproductive biology as a means of expanding the research potential of the clinical department and of keeping the basic research focused on its eventual practical application. The grants provided for the full salary of a new faculty member with a Ph.D. in relevant areas of reproductive biology, or equivalent research experience; the investigator was based in the department of obstetrics, with a joint appointment at the assistant or associate professor level in obstetrics and in his own basic sci-

ence field. The grants also covered reasonable laboratory costs, minor research equipment, and the salaries of one or two technicians.

• Special one-year postdoctoral fellowships in reproductive biology provided full support and modest research expenses, renewable to a maximum of three years. About eight awards were made each year, of which two or three went to physicians who had completed their clinical specialty training in obstetrics and were preparing for careers in academic obstetrics.

Together with the Ford Foundation, a competitive research program in population policy was initiated in 1970 to promote studies of population behavior, its determinants, and the outcome.

In June 1977, after a major turnover of staff in the Rockefeller Foundation's health and population programs, a Division of Population Sciences was established. Sheldon J. Segal, Ph.D., senior vice-president of the Population Council and director of its Center for Biomedical Research, was appointed director of the division.

The programs today emphasize the impact of population growth over the next two decades, and special opportunities in social and economic demographic research. The three fundamental components continue to be research in reproductive biology; research on new contraceptive technology; and policy studies. The major emphasis in reproductive biology is on control of fertility in the male.

A new program in cooperation with the Communicable Disease Center of the United States Public Health Service prepares epidemiologists for work in developing countries.

During the past seven years the social science components of population policy have become increasingly important, and the Rockefeller Foundation is supporting such studies in both developed and developing countries.

MACY FOUNDATION

In 1955 the Josiah Macy, Jr. Foundation established a major program to develop reproductive biology as the basic science of academic obstetrics. For many years obstetrics and gynecology

had been the least scientific of the major clinical departments. (A major force in the decision to launch the program, incidentally, was Howard C. Taylor, Jr.)

The program focused on training men and women at Macy-sponsored centers at Harvard Medical School, the College of Physicians and Surgeons of Columbia University, and the School of Medicine of Washington University in St. Louis. Close to fifty individuals were trained for academic careers; fifteen of them hold or have held chairmanships of academic departments. Eight basic science departments conducting fundamental studies in reproductive biology received program support and fellowship awards. A third phase of the program made available scholarship funds in fifteen medical schools for students to conduct research in reproductive biology.

These programs terminated in 1966. With major programs initiated by other foundations and governmental agencies to support research and training in reproductive biology and population control, the Macy Foundation decided to focus on assistance to academic departments with new leadership. Five-year grants were made to six medical schools to cover faculty salaries, summer student fellowships, and postdoctoral fellowships.

Macy conferences on teaching family planning at the national and international levels seem to have had their widest impact in the United States and, especially, Latin America.

The program to strengthen academic obstetrics may be considered one of the Macy Foundation's more successful efforts in American medical schools.

Academic Obstetrics in the British Isles

David T. Baird

INTRODUCTION

Although obstetricians were among the first clinicians to assess the results of their practice by systematically recording vital statistics such as maternal and perinatal mortality, obstetrics and gynecology has lagged behind medicine and surgery as a true academic discipline. The many reasons for this, which have been discussed at length elsewhere,[1] include the arduous and time-consuming nature of the work, the necessity to deal with pressing clinical problems quickly, and the considerable financial rewards that favor the less academic aspects of the specialty. It is also probably relevant that research on fundamental reproductive physiology and biochemistry has lagged behind that of the other systems because of cultural inhibitions. Hence until recently it has not been possible to apply scientific method to the problems of clinical practice in obstetrics and gynecology because the pyramid of relevant knowledge did not exist.

I suspect that every generation imagines it is living through a period of unique change. I do not think it presumptuous to say, however, that in the last twenty years the increasing awareness of the dangers of overpopulation in a world with limited resources has stimulated research in reproductive biology. It is with this knowledge that obstetrics and gynecology, as the clinical discipline concerned with human reproduction, is emerging as an academic subject.

It is impossible for any one person to represent a unified view of "academic obstetrics in the British Isles"; there are of course

differences throughout the country, but I suspect they are not as great as in the United States. As a Scot, I am proud of the fact that our medical schools were the first to realize the importance of the academic development of our subject.

In this paper I shall outline briefly: 1) medical schools in the United Kingdom and Eire (Republic of Ireland) with departments of obstetrics; 2) undergraduate teaching programs in obstetrics and gynecology; 3) postgraduate training; and 4) research. In each section I will point out the advantages of the present situation before trying to identify current problems.

MEDICAL SCHOOLS

At the present time, thirty-three medical schools in England, Wales, Scotland, and Northern Ireland, and five in Eire, offer preclinical and clinical training in obstetrics and gynecology.

The body with overall responsibility for medical education in the United Kingdom and Eire is the General Medical Council (GMC), founded in 1858. It is made up of representatives of all the medical schools and bodies licensed to award degrees and diplomas. Originally it was not the responsibility of the GMC to lay down recommendations about the medical curriculum, but to assess each on its merits and to pronounce it "sufficient" or "insufficient." Over the years, however, the GMC has established certain recommendations, which according to a former president, Sir Donald McAlister, were arrived at by "full and free consultation with teachers and teaching institutions, followed by equally full and free debate in this Council, in which all the medical faculties and corporations are represented."[2] Hence the GMC's recommendations were "the expression of a concordat amicably reached, not of an ordinance framed and issued by external authority." The system of pronouncing "sufficient" or otherwise had the advantage of permitting the development of a wide variety of medical curricula. Thus "The Council thinks that it is now widely accepted that in medical education there is no single pathway to success. Identity rests not in the path but in the goal."

The GMC has recently published a review of medical education in the United Kingdom and Eire that includes a survey of the

teaching of obstetrics and gynecology, as well as of human reproduction and family planning.[3,4] Of the thirty-eight medical schools, thirty-five offer a complete five- or six-year course.

The intake of students in 1974 was 3,470, of whom about 3,000 graduated. Scotland, with a population of 5 million—about one-twelfth of the total population of the United Kingdom—had an intake of 695 students to its five medical schools; thus the student: population ratio is almost twice the United Kingdom average.

Each medical school now has a chair of obstetrics and gynecology, although in some of the London schools the post is shared by two schools. The vast majority are full-time academic staff who are not permitted to practice privately so, at least in theory, they can devote their entire time to academic work. In practice, many departments are still relatively understaffed, so that an undue proportion of time is spent on service activities.

In Scotland there is a more favorable pattern of staffing, with each department of obstetrics having between six and ten full-time staff in addition to the professor. Also, there are at least an equivalent number of National Health Service (NHS) clinical staff members, many of whom work full time. Thus in effect the number of staff available to the department for clinical teaching and research is doubled. Each clinical member of the academic staff has an honorary clinical appointment with the local health board and this carries with it certain substantial clinical responsibilities. In the better medical schools the difference in duties between the university- and NHS-paid clinicians is therefore one of emphasis rather than of kind and there is frequent interchange of staff between the two organizations.

In accordance with the equivalence of duties, the pay structure for the NHS and university clinical staff has been comparable. The fact that both have been equally "poorly paid," as some would have it, has meant that, at least outside London where private practice still flourishes on a wide scale, there has been little financial incentive for the more able clinicians to leave academic life. Recent changes in the NHS pay structure, however, away from salaried service toward a system of service payments may alter this in the future.

7.1

UNDERGRADUATE TEACHING

The average student enters medical school in the British Isles straight from school at the age of eighteen or nineteen. The average course lasts five years, with the first two covering preclinical subjects—anatomy, physiology, biochemistry, etc.—and the last three being devoted to paraclinical and clinical subjects.

The curricula of six of the thirty-four clinical schools surveyed in 1974 included separate courses in human reproduction, usually in the second year.[5] At the University of Edinburgh, in the first and second years reproductive biology is included in the courses in anatomy, physiology, and biochemistry. During the third year, the first full clinical year, there is a three-week course entitled "Human Reproduction and Sexuality," in which reproductive disease, including its pathology and microbiology, as well as human sexuality and sexually transmitted disease, are covered. The principal aim of the course is to equip the student with the skills necessary to take a history from and examine a patient with a reproductive problem. It is hoped that she/he will practice these skills throughout the clinical years.

In the final two years of study students rotate to various wards; eight weeks are allocated to obstetrics and gynecology. During this time they are expected to follow a fairly well-defined program of work that includes perinatal medicine, antenatal care, fertility regulation, reproductive endocrinology, gynecological oncology, and genitourinary medicine. The attachment is in the form of a clinical clerkship, with the students being a part of the health care team. Their progress is assessed by a clinical tutor, and this evaluation contributes 33 percent to the grade in the final examination held at the end of the attachment.

The pattern of teaching described is fairly representative of many medical schools in the United Kingdom, with an overall average time of attachment being 11.3 ± 2.9 weeks; in many London schools, however, up to 16 weeks are allocated to obstetrics and gynecology. This has the advantage that students, attached in groups of four, have plenty of opportunity for day-to-day contact with patients. In Scotland all the main teaching hospitals are the principal regional hospitals for the area. With virtually

no private practice of obstetrics, all patients are available for clinical teaching. Hence, even with the 30 percent fall in the birth rate, there is no shortage of patients.

The major disadvantage of this system of clinical teaching is "faculty fatigue." In my view it is unrealistic to expect university staff to teach forty-eight weeks a year and still maintain the same enthusiasm and commitment to their work. I am a lone voice among my clinical faculty in suggesting that a compromise must be struck between what is ideal for the student on theoretical grounds and what is practical to provide. We are experimenting with a system under which the number of students attached to a clinical unit is increased, but with each unit lying fallow for part of the time.

POSTGRADUATE TRAINING

While it is appropriate to introduce the medical student to the elements of reproductive medicine, it is now generally agreed that operative obstetrics and gynecology is best taught after graduation. The pattern of training is fairly well standardized by the Royal College of Obstetricians and Gynaecologists (RCOG), which supervises posts available for training and awards postgraduate diplomas. While there is no legal requirement to meet the recommendations of the RCOG before being appointed to a consultant post, in practice all candidates for senior registrar posts must have the MRCOG diploma. The total training period is from six to ten years, so the average age on appointment to a consultant post in the specialty is thirty-four to thirty-seven.

Many doctors obtain the MRCOG diploma during registrar grade, at a time when they are deeply involved with inservice work. The elective year has proved to be a flexible way of allowing the trainee to gain further experience in the field of her/his choice, for example, surgery, pathology, general practice, or research. In a few centers the elective is built into the training program, but in many it is up to the individual to find a suitable post. Only about one in three registrars will be promoted to senior registrar, and eventually to consultant, because the number of senior registrar posts is geared closely to the number of con-

sultant vacancies likely to occur. This narrowing of the pyramid has been much criticized by those trainees at registrar grade, but it does allow for the training of many doctors from overseas who intend to return to their countries of origin.

It is difficult to see how one could devise an alternative system that would not involve selection of candidates at a very early stage in their careers. Once appointed, the senior registrar is virtually assured of a consultant post eventually, although not necessarily in the region or hospital of her/his choice. Most doctors spend three to four years at the senior registrar level, during which time they will have an opportunity to develop a "special interest" in, for example, gynecological oncology or endocrinology.

Although senior registrar posts are theoretically supernumerary to the establishment, in practice the senior registrars are key figures in the organization of obstetrical and gynecological care. They are usually in their early thirties, and, with five or six years of clinical experience in the specialty, capable of handling most emergency situations. Superspecialization in obstetrics and gynecology has not yet been officially recognized by the RCOG, although an increasing number of gynecologists are developing "special interests." Thus the larger academic departments hope to build up a team of experienced consultants, each an expert in a particular "ology."

In the academic career structure there are grades corresponding to those in the NHS, that is, lecturer, senior lecturer, reader, and professor. The chairman of the academic department of obstetrics and gynecology is nearly always the professor, although in many cases not the chairman of the clinical division of obstetrics. This arrangement has the advantage that the professor of obstetrics, whose primary responsibility must be teaching, always has access to patients without necessarily having the responsibility for the organization of the entire clinical service. It is perhaps one of the reasons why professors are prepared to take on the chairmanship for periods of longer than three to five years, thus allowing the long-term development of a university department.

While the subconsultant grades—senior house officer, registrar, and senior registrar—are all temporary training posts for a limited period, the same does not apply to the lecturer grade. This flexibility in lecturer posts permits those who wish to do so to register for a higher degree, M.D. or Ph.D., during their period of training. Because of the pressures of teaching and clinical practice, however, full-time research can only be guaranteed by obtaining a fellowship. Several bodies such as the Wellcome Foundation and the Medical Research Council (MRC) award research fellowships specifically to permit training in human reproduction. Unfortunately these usually involve a drop in income, owing to the fact that the posts do not generate the additional sources of funds available in the clinical service posts.

In summary, the present system of postgraduate training in obstetrics and gynecology in the United Kingdom seems to work fairly well, providing a rather even standard of clinical training throughout the country. Until very recently the flexible interchange of doctors between the NHS and the university, and the comparability of their earnings, have made the recruitment of staff to academic university departments relatively easy.

RESEARCH

The development of obstetrics and gynecology as an academic discipline depends on the recruitment of competent physicians and scientists. While the subject—and its clinical practice—has been popular in the past, it has failed to attract the more able students. With the great expansion in research in reproductive biology in the last fifteen years, the potential of its application to the field of reproductive medicine has become apparent. Thus I am optimistic that the long-awaited change in the nonacademic image of our specialty has already occurred.

Over ten years ago the MRC appointed a committee chaired by W. S. Peart, professor of medicine at St. Mary's Hospital Medical School, London, to investigate ways to stimulate research in obstetrics and gynecology. One of the recommendations of the

committee was that there should be an adequate career for clinical research scientists. Since then the MRC and the Wellcome Foundation have established several long-term career posts, equivalent to the career development awards, for which clinical scientists with established reputations may apply. More recently they have invited universities to nominate individuals for research professorships to be funded entirely by the MRC. By these means individuals of ability can be relieved of enough clinical and teaching duties to allow them to pursue full-time careers in clinical research.

Another consequence of the Peart Committee was the establishment of a MRC Unit of Reproductive Biology. The decision to start a unit to encourage research on a specific topic was a new venture for the MRC. Usually such units are set up in hospitals or universities around a research worker who has a considerable reputation. On this occasion all the medical schools in the United Kingdom were invited to apply for funds to establish such units. Roger Short was persuaded to come to Edinburgh from Cambridge to direct the new unit, which was placed in the medical school in close association with the Department of Obstetrics and Gynaecology. In addition to its research activities, the unit has a specific responsibility to participate in teaching reproductive biology to medical students. The presence of an active research unit attached to the university department has already attracted several clinicians to research posts. In this way it is hoped to recruit some of the more able medical graduates to academic obstetrics and gynecology.

SUMMARY

The present state of obstetrics and gynecology in the British Isles has been reviewed. The arrangements for undergraduate and postgraduate training of obstetricians appears to be fairly even throughout the country. Although the system of postgraduate training supervised by the RCOG ensures a reasonable standard of clinical training, it has not helped to attract the more

able medical graduates to the specialty. By establishing research units in association with undergraduate departments, and by providing prospects for clinical scientists, the MRC and other research organizations have already helped to establish the scientific basis on which academic obstetrics can flourish.

NOTES

1. *The Training of Obstetricians and Gynaecologists in Britain and Matters Related Thereto* (Macafee Report), Report of a Select Committee of the Royal College of Obstetricians and Gynaecologists (London: n.p., 1962).

2. *Basic Medical Education in the British Isles*, vol. 1, *General Section and School Profiles* (London: Nuffield Provincial Hospitals Trust, 1977): xi.

3. Ibid.

4. *Basic Medical Education in the British Isles*, vol. 2, *Teaching of the Component Disciplines/Specialties of the Medical Course* (London: Nuffield Provincial Hospitals Trust, 1977).

5. Ibid.

EDUCATION IN ACADEMIC OBSTETRICS:

Robert B. Jaffe

It is an interesting commentary that this conference is being presented under the aegis of the Macy Foundation and the National Institute of Child Health and Human Development. For the foundation first sponsored my career in academic medicine—and those of several of my colleagues—when I was designated a Macy Faculty Fellow in Obstetrics and Gynecology at the inception of my academic activities, and the NICHD has provided the bulk of the funding for my subsequent investigative and training programs. Unfortunately, the faculty fellowships were offered to only one group of obstetrician-gynecologists for a three-year period, and research and training funding from the NICHD has become extremely precarious.

It is not from a negative vantage point that I wish to discuss training for academic obstetrics and gynecology, however. Rather, I will describe the milieu in which such training should occur and the myriad exciting opportunities I see for a fruitful and productive career in this all-embracing discipline. If appropriate and adequate resources, time, and environment are made available, I believe the future for the academic aspects of the discipline is a bright one—as is evident from the 500 to 800 inquiries a year for the past few years our department has received from some of the most talented, academically successful medical school graduates for our seven first-year house officer positions.

For an academic department of obstetrics and gynecology to flourish the medical school must have a commitment to reproductive medicine and biology, a commitment that should be expressed in appropriate and mandated time in the curriculum, adequate

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financial support for faculty and staff, and appropriate clinical, administrative, and laboratory space.

THE ACADEMIC MILIEU

It is not possible to discuss academic training without touching on the academic environment in which it occurs. I shall first mention some of my philosophical concepts of the nature of such an environment, and then turn to the components necessary to produce it.

Academic obstetrics and gynecology must expand its horizons to truly embrace the totality of reproductive medicine in its broadest construct, including those biological and sociobehavioral sciences that impinge on reproductive medicine and biology.

We renamed our department the Department of Obstetrics, Gynecology, *and Reproductive Sciences*, not from a sense of shame but because we recognized the broader scope that should characterize the discipline today. Among the facets of reproductive medicine and biology that should be represented are: 1) fetal and maternal medicine and physiology; 2) endocrinology and infertility, from the molecular to the whole organism level; 3) oncology; 4) reproductive genetics, including molecular and biochemical genetics as well as clinical genetics; 5) reproductive immunology; 6) infectious disease; 7) family and population planning; 8) pharmacology; 9) innovative women's health care systems; 10) psychosocial aspects of women's health care; and 11) nutrition, again, including biochemical and clinical aspects. Perhaps we might add interactions with the political process, as Louis Hellman noted earlier. I wonder if this might not be a logical activity of some of the more senior members in a department.

It is apparent that not each department will have major strengths in each area. Several points are worth making in this regard. All departments cannot and should not be structured along similar lines with similar goals. Because of the nature of the mission and objectives of the school, and of the composition and orientation of the faculty and the resources available, it is appropriate for certain departments in certain institutions to gear their programs to the training of health care providers who

will be primarily concerned with the private practice of obstetrics and gynecology, and for other departments to admix an orientation toward academic careers with training in clinical care. Both types of programs are of equal merit and are equally essential, and it is appropriate for both to be carried out in university centers; it is likely that the future of residency programs not affiliated with university centers will be limited, and that they will probably be discontinued.

Further, for investigative and training programs in the subdisciplines mentioned to flourish, it is important to have a critical mass of physician-scientists in particular areas, rather than, for example, one perinatologist or one endocrinologist. To amplify and augment these programs the other resources in the school should be drawn upon. At our institution the reproductive endocrinology and infertility group includes members with appointments in the Departments of Internal Medicine, Laboratory Medicine, Pathology, Physiology, and Biochemistry and Biophysics, and the Hormone Research Laboratory, in addition to the clinicians and basic scientists in the Department of Obstetrics, Gynecology, and Reproductive Sciences, who are primarily involved in endocrine-related activities. Similarly, the six subspecialty, board-eligible or -certified fetal and maternal medicine group members draw heavily on the resources of the Departments of Pediatrics, Anesthesiology, and Radiology (ultrasonography), and the Cardiovascular Research Institute, and our oncologists interact extensively with the Cancer Research Institute, the Department of Radiation Oncology, and the Hormone Receptor Laboratory. There is a need for greater interaction between oncologists and molecular biologists. In like manner, reproductive genetics has numerous interactions with the other basic and clinical genetic activities on campus. Joint appointments and interdepartmental collaboration are strongly supported and encouraged.

From my viewpoint, in a department geared to training academicians, most faculty members should have training in a particular subdiscipline in addition to sound grounding in obstetrics and gynecology. But, of equal importance, there must also be

individuals who derive satisfaction from giving and teaching excellent patient care in the general aspects of obstetrics and gynecology. Both types of individuals are essential for a satisfactory teaching program for students and house officers.

One problem that arises, however, and one for which I believe there is no completely satisfactory answer, is the difficulty of maintaining clinical competence in the various facets of obstetrics and gynecology while pursuing subspecialty and investigative interests. Many clinician-investigators must grapple with this issue, and its solution is not always apparent.

Another problem that can arise is the antipathy that may develop between the academician who devotes the bulk of his/her time to clinical care and teaching and the physician-investigator who dedicates most of the time to investigative pursuits. The clinicians feel they are working longer hours than their facultymates, and that the investigators enjoy more notoriety and are promoted more readily. The physician-investigators, on the other hand, may resent the greater income sometimes earned by their counterparts, and are often insecure about their clinical skills and sources of funding. These differences often must be dealt with on an individual basis, but they are never completely resolved and are usually minimized in a department and school in which both types of activities are seen as being equally valuable and essential, and in which both are recognized and rewarded.

RESIDENCY TRAINING

I shall turn my attention now from the appropriate academic environment and its components to a consideration of attracting residents to academic careers and their training. Actually, recruiting individuals to the discipline initially, and interesting them in an academic career, should and often does begin in medical school. For this reason it is important for faculty members in departments of obstetrics and gynecology to make early incursions into the curriculum. Members of our department participate in a number of first- and second-year courses; in the second year they also teach, with pediatricians, a sequence in reproduction, growth, and development.

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A variety of factors are currently attracting some of the brightest, most innovative individuals to obstetrics and gynecology. First there is a heightened sense of social conscience and concern among many of the currently graduating medical students, who see in obstetrics and gynecology an opportunity to address these concerns in such areas as population and family planning; preventive health care; improved health care for women, both physical and emotional—perhaps a reason for the dramatic increase in the number of women entering the specialty; and improvements in maternal care and nutrition among underserved populations.

Second, reproductive biology is at the cutting edge of scientific investigation today. Witness the fact that well over half the articles in the leading endocrinological journals, both basic and clinical, are concerned with reproductive endocrinology. Many of the most talented medical students with an investigative bent perceive the excitement of research in reproduction, and see obstetrics and gynecology as the most logical avenue of entry into this area. And like begets like; as more of these individuals enter this academic arena they will stimulate and entice others to do so. The dramatic increase in the quality and quantity of scientific presentations by young obstetrician-gynecologist investigators at the most recent annual meeting of the Society for Gynecologic Investigation is but one reflection of the fruits of this phenomenon.

How does one convey the excitement of generating new knowledge, of solving a previously unanswered medical or basic science problem? Those who have had this heady experience have difficulty communicating it to others who have not. But as more and more talented physician-investigators enter the field they will serve as role models to attract more like-minded individuals.

Third, a number of individuals are of course attracted to the discipline by the opportunity to embrace medical, surgical, social, psychological, and investigative activities all within one specialty.

These are but a few of the factors that are attracting people to obstetrics and gynecology.

How should they be trained during their residencies, and to what extent, if at all, should their training be different, if one

of the aims is to prepare individuals for academic careers? The foundation of residency training in obstetrics and gynecology is mastery of the clinical skills and the pertinent literature necessary to become an accomplished and proficient clinician. There is no time during the regular residency rotations to carry on substantive laboratory research projects pari passu with clinical work; if it is attempted, clinical training suffers and the resident is torn in several directions. It *is* appropriate for residents to become involved in literature reviews and clinical prospective and retrospective studies that do not interfere with the satisfactory performance of clinical duties. The residents should be encouraged to present and to write up the results of these studies. It also is appropriate for them to carry out research projects during the elective time in their programs. These projects will depend on their interest, past experience, and the area of expertise of the faculty members with whom they spend their elective time. I do not believe research experience should be mandatory for all residents.

For the potential academician who does not know the area in which he/she would like to concentrate upon completion of residency training, it is important that the program in which the residency is served have representation from all the major subdisciplines. It is difficult for a resident to select a subspecialty without either prior exposure to it, or exposure during the course of the residency. Too few current university obstetrical and gynecological programs contain adequate representation of the subspecialties of reproductive medicine and biology. It is my belief that departments that have widespread representation of the various facets of reproductive medicine and biology are the ones that should be recruiting individuals most likely to pursue academic careers. Not to do so is to make less than optimal use of faculty resources.

During the residency, continual emphasis should be placed on knowledge of the literature and on how to critically evaluate it. In addition to journal clubs, repeated challenges by faculty members concerning current literature are appropriate.

Whether all residents should have a lock-step program, identical for all regardless of their future career plans, is an unsettled question. In our department we have discussed, but not yet implemented, a four-year residency program in which the first two years would be the same for all residents, while the last two would be individualized depending on the resident's future plans. Thus the person planning a career in fetal and maternal medicine would spend more time during the last two years in obstetrics, the intensive care nursery, and related activities; the individual planning a career in oncology would have more exposure to surgery, urology, chemotherapy, and oncological research. Such programs would present a number of logistic difficulties, but they might be more relevant to the residents' career goals.

In summary, then, the residency program for individuals planning an academic career should first and foremost provide sound clinical training, undiluted by concurrent laboratory research. Such research can, however, be done in elective time; this should be encouraged but not mandated. The resident should be exposed to faculty members pursuing investigative and clinical activities in the various subdisciplines of reproductive medicine and biology, in addition to classical obstetrics and gynecology. A comprehensive and critical grasp of the literature is essential, and the resident must be instilled with the necessity of continuing to keep abreast of the literature as a lifelong activity. The question of the degree of individualization of residency programs awaits further discussion.

FELLOWSHIP TRAINING

Advanced training, beyond residency, for an individual planning to enter an academic career should be addressed next. My bias is that the great majority of graduates who wish to pursue academic careers should receive advanced training. While enthusiastic, intelligent, motivated individuals can enter an academic position directly after residency and contribute meaningfully for several years to the teaching and clinical programs, their careers usually become stagnant and their contributions wane.

Further, most of them are unable to contribute in a significant manner to the generation of new knowledge in the clinical or investigative spheres.

There is, however, a need and a place for those who devise and implement innovative health care delivery and educational systems. These individuals have the obligation to publish the successes and failures of these innovative systems, just as their peers doing clinical or basic research have an obligation to publish and disseminate their findings. It is not sufficient to pursue a practice similar to that conducted in the community, but displaced to a university setting.

Those pursuing careers that include clinical or basic research must prepare themselves adequately for this activity. Science in general, and reproductive science in particular, is moving too rapidly for untrained novices to compete successfully. There must be a period, usually an absolute minimum of two years, during which an individual is freed from the necessity of engaging in extensive clinical and administrative responsibilities and has the time to obtain the technical competence and problem-solving orientation that will be necessary for a productive, independent investigative career in some facet of reproductive biology. During this period the trainees should be in an environment in which they are exposed to a number of well-grounded, stimulating investigators who can fire their imaginations and communicate to them the excitement of research. Individuals who enter postdoctoral laboratory research fellowships after completing a residency must be prepared, emotionally, to leave something they know and do well and enter a field in which they again will be novices. This experience is often stressful, and, unless he/she is adequately prepared, it may dissuade the trainee from a research career.

In my view it is best for the trainee to be a part of a group of faculty investigators and other trainees, rather than to work in isolation. As is true with residents, postdoctoral trainees learn from their peers as well as from their mentors. In many instances an admixture of both M.D. and Ph.D. postdoctoral trainees is

advantageous, as is an investigative training faculty on which both groups are represented.

In addition there should be a formal training program with didactic seminar and workshop sessions in which the fellows participate actively. Let me use the example I know best—training in our Reproductive Endocrinology Center, where there are fifteen faculty members and approximately an equal number of postdoctoral fellows, both M.D.'s and Ph.D.'s, as well as, currently, two graduate students.

In addition to a full range of clinical endocrinological and infertility activities, four regularly scheduled weekly meetings are held on different days:

- The Reproductive Endocrinology Workshop, to which the fellows present to the members individual research projects that are discussed at their inception and while in progress. Both fellows and staff participate actively in these discussions. The research discussions occur on alternate weeks with the Endocrinology Journal Club, at which fellows present current research papers of interest that are critically reviewed by other fellows and faculty.
- Reproductive biology seminars, during which the center's staff, other university faculty members, and visiting scientists present their work.
- Clinical gynecological endocrinology and infertility conferences, in which interesting cases are discussed and pertinent journal articles reviewed.
- Meetings of individual staff members and the fellows.

The trainees also attend a number of formal courses given by faculty members of the center. These include: 1) morphological correlates of neuroendocrinology; 2) electron microscopy in reproductive biology; 3) laboratory techniques; 4) principles of hormone binding and mechanism of hormone action; and 5) reproductive endocrine physiology.

In addition, most of the trainees take a course in statistics offered through the Cardiovascular Research Institute, and some take a course in scientific writing also offered by the institute. Further, those trainees with an interest in neuroendocrinology

attend the weekly two-hour seminar in this area in the Department of Physiology.

The remainder of the time is spent in research activities and clinical care of patients with endocrinological and infertility problems. This combination of formal training, lectures, and seminars and practical laboratory and clinical experience is useful for the appropriate training of obstetrician-gynecologists who plan to pursue investigative careers in academic medicine.

EARLY FACULTY TRAINING

The training of an academician does not end when the individual finishes a fellowship. For the physician-investigator, particularly, the first few years of a faculty appointment are critical. During this period the young faculty member-investigator must be protected from so heavy a clinical, teaching, and administrative load that he/she does not have the time to establish an investigative program and initiate the grant-seeking process.

My impression is that clinicians, even academically based clinicians, often do not appreciate the time required to carry out meaningful research activity, and thus do not see the necessity for providing unfettered time for the investigator. I am reminded of an experience I had as a postdoctoral fellow in Stockholm: a gynecologist telephoned the director of the clinical laboratory to ask whether a gonadotropin measurement had been performed on a Mrs. Johansson. When told that it had not yet been done, the physician responded, "That's all right. I'll hold the phone while you run it."

The academic obstetrician-gynecologist-investigator must have time to develop his/her own research program. There must also be an environment in which there is continual stimulation from, and interaction with, a broad spectrum of investigators. The clinician-investigator working in isolation has difficulty sustaining creative activity.

While I have focused on the academician-investigator, I do not believe all department members can, or should, be engaged in what is classically thought of as research. I do feel, however,

that each faculty member has an obligation to engage in innovative and creative activity and to communicate the results of this activity to the medical and scientific community at large. Innovative health care delivery systems, innovative teaching techniques, and innovative diagnostic or therapeutic modalities are all appropriate scholarly pursuits, and all should be represented in a well-established academic department of obstetrics and gynecology.

A School of Family and Community Medicine

Hiram W. Mendenhall

A chameleon is a delight to the eye and a marvel of adaptability. Responsive to a variety of stimuli, it is suited to survival, reacting quickly to altered circumstances or perceived dangers in ways that favor its continued existence. But I will return to the wondrous ways of the chameleon a little later.

It is quite a challenge to be invited to address the topic of education in academic obstetrics in a school of family and community medicine, particularly as I am not certain just what such a school is. Is it devoted to primary care and to education and service to a community? Or is it a developing imitation of the more established institutions? Are all of its academic departments committed to the same goals? Is it involved in the medical affairs of the community, and are the local physicians integrated with the faculty? Is it a new school, or a responding segment of an older, established, prestigious school? I suspect that throughout the United States we may find some schools with very few of these features and some with all or almost all of them, each considering itself in some degree a school of family and community medicine. Such variation surely exists in the departments of obstetrics and gynecology within these schools.

For the past five years I have been chairman of a developing department in a new school in a lovely and traditionally southern town not noted for its interest in change or response to outsiders. Its small state-supported university now owns a hospital, formerly the Mobile General Hospital; its medical college teaches students on a split campus and supports a large house staff. Currently the hospital is in dire financial straits; the Department of Family Practice is a shambles; the role of the school in the community remains ill defined; and a search is underway for the fifth dean in the school's short history. The service and teaching tasks of the Department of Obstetrics and Gynecology have expanded considerably, yet faculty recruitment has been severely curtailed. Parenthetically, if education is acquired through the process of making many mistakes, perhaps I qualify for a degree summa cum laude.

Before looking at academic obstetrics in a school of family and community medicine, loosely defined as it may be, it would be well to examine briefly events of the past two decades that have been instrumental in our arriving at the present situation.

When the powers residing a few miles north of Williamsburg decreed that educational institutions should concern themselves more with health care services and an increase in the output of physicians and less with basic research, and then reinforced their decision by altering the distribution of funds, this seemed a mandate to academic obstetrics in old and new schools to go forth into the community. The migration of affluent patients from inner to outer cities, however, caused dislocations in available and developing facilities. And new physicians had acquired skills that tended to lessen their dependency on their parent institutions at a time when academic obstetrics was involved with information and technology explosions that promised answers to many of our major problems in rendering quality care to all women.

A working interdependence between the medical school and community hospitals was considered a desirable goal. But the many factors fundamental to creating a firm integration of school and community were poorly understood. Having demonstrated

its expertise in traditional academic settings, obstetrics was being asked to carry the message throughout the land.

How logical it seemed to involve communities and their hospitals in the process of education. Although little was known of the economic features and consequences of a loose interdependence of a medical school and community hospitals, such a move appeared to be a cost-effective way to increase educational output. Medical schools could be built or altered to be truly community based, with a deemphasis on research and a greater emphasis on education for all. The costly and proliferating "edifice complexes" that are indigenous to schools of medicine and their parent institutions might be avoided. Regionalized care could become a reality for consumer and purveyor alike.

Perhaps the problem of physician distribution in our discipline might be relieved by training family practitioners, whether or not they were truly interested, to do many of the tasks that we have demonstrated are not always easily performed in a satisfactory fashion. After all, in World War II the United States Army satisfied its need for trained leaders by programs that produced the "ninety-day wonders" we all remember. Now, only a few short years later, our political leaders are telling us that there are too many physicians, that we have not emphasized health maintenance sufficiently, and that we have assumed little responsibility for the epidemics of easily preventable illnesses surrounding us.

Perhaps the interesting and challenging aspects of academic obstetrics lie more in the ways it will cope with the vagaries of human nature and political tactics over the next few years than in the actual physical settings: communities and their leaders manipulate their forces to create medical schools; students arrive in increasing numbers; knowledge continues to expand; problems abound; and the role of academic obstetrics in schools of community and family medicine is ill defined. The experiment is in process, errors will be made, and numerous problems and opportunities are to be expected (Table 1).

Before examining these more closely, perhaps we can agree that the schools should meet a demonstrable need; arise from

TABLE 1. ACADEMIC OBSTETRICS IN SCHOOLS OF FAMILY AND COMMUNITY MEDICINE

Problems	
Teaching	Serving
Testing	Defining
Relating	Funding
Competing	Research
Cooperating	Recruitment
Growing	
Opportunities	
Teaching	Serving
Testing	Recruitment
Relating	

local initiative; have the assurance of adequate financial support; and possess appropriate educational and clinical support. Furthermore, they must have a commitment to the community and a commitment from the community. Obviously there are many potential points of stress in such a structure; academic obstetrics needs administrative, political, and persuasive powers not usually acquired in residency or subspecialty fellowship training.

What are some of the problems? Basically they relate to imposed or feared change in the prevailing customs of the community. As in so many human endeavors, if there are strong economic needs to develop interdependence, a relationship may develop easily. The task of defining the role of academic obstetrics in a community setting must be done with the cooperation of physicians who have already established their commitment to the community. Misinterpretation of each other's roles can hinder the collaboration of academic and nonacademic physicians.

To gain support, the community physician must become involved in the activities of an academic department. When given the opportunity, many practicing physicians are accomplished teachers and superb role models for medical students. These physicians must be reassured of their value; informed of advances in the field; assisted tactfully by those with specialized knowledge when problems plague them; and compensated in a variety of ways for their participation. In a community school the aca-

demician does not receive endorsement of his capabilities in clinical service, education, or research until he has demonstrated them to his students and his colleagues in the new setting. Initially, basic research during its developmental period may require funding from patient care revenues or the parent institution rather than support from traditional research sources.

Didactic teaching is no more difficult in a community school—nor is the testing of its effect—than in the more established institution; but clinical teaching performed by community physicians is difficult to evaluate, and requires, foremost, the selection of skilled and conscientious individuals who will teach in all the hospitals in which the academic department has commitments.

Funding for academic departments is multifaceted, but if the planning is careful it should be adequate with the mechanisms currently available. Community support for academic departments may consist of using full-time faculty as consultants; providing beds for teaching purposes; supporting house staff expenses; creating laboratory space; and purchasing equipment. Growth will depend on the needs of and changes in the population served, and not necessarily on the ambitions of the academic department.

Early in its development the department must recognize the fears of the community physicians that it might pose a serious economic threat. In time, lack of sufficient physical space it can call its own may disturb the members of an academic department, but flexibility and the use of available, though often scattered, space can be most helpful.

If located in a school committed to educating physicians who will provide primary care to its own or surrounding communities, the obstetrics department will in all probability be responsible for training family practitioners. In this regard I believe we are in an unfavorable situation at present. Not privileged to select the residents, obliged to teach normal obstetrics in a very limited time span, and aware that many trainees will never practice obstetrics, and hence will be overtrained, whereas others will practice but will be undertrained to handle the emergencies that will inevitably come their way without consulting backup, we are

fostering the delusion that we are helping to solve the problem of maldistribution of quality obstetrical care.

If family practitioners include obstetrical care among their services, and many must, let them first commit themselves to adequate obstetrical training—at a minimum, one year, and preferably eighteen months. As I am sure we all agree, in the provision of obstetrical care a little knowledge is a dangerous thing. Were family practitioners well informed about medical gynecology, competent in family planning, and truly concerned about adequate prenatal care and avoidance of potentially operative situations, many of us involved in the training they now receive would be more receptive to their presence.

Academic obstetrical departments are well suited to be the central point in regionalized care systems. A flow of high-risk patients from the periphery of family practitioners and general obstetricians to the perinatologists in the university is one way to care for complicated gestations. Schools of family and community medicine would seem to fit satisfactorily into this scheme. The pitfalls—social, economic, and psychological—of the system as presently espoused, especially in highly rural areas, are numerous. The potentials are great, but I often envy the composure with which neonatologists urge us to effect elaborate maternal and newborn transport systems.

None of the promises of academic obstetrics in schools of family and community medicine can be fulfilled without adequate numbers of full-time faculty. The figures on present and projected needs are anxiety provoking (Tables 2 and 3). Are there really enough pioneers coming along who enjoy tackling the challenges I have mentioned? Many of those available for recruitment to academic obstetrics seem as much concerned with security in our inflationary economy as with opportunities for service, research, and innovation. Understandably so, because if they perform in less than an outstanding manner in a new or community school, what chance is there for them to return to the prestigious institutions where they were trained? On occasion I wonder if academicians in established schools should not take their sabbaticals in developing schools. Surely the benefits in both

TABLE 2. ACADEMIC OBSTETRICS. VITAL STATISTICS, 1979
(APPROXIMATE FIGURES)

Medical students		60,000
Medical school graduates		15,000
Residencies in obstetrics and gynecology		4,785
First year: 897 in 252 programs		
Residencies in family practice		7,457
First year: 2,118 in 304 programs		
Faculty positions filled		1,556
Faculty positions vacant		238 (13% of positions)
Subspecialties certified as of May 1979		396
Maternal-fetal medicine	149	
Reproductive endocrinology	86	
Oncology	161	

directions would be considerable. One solution to the recruitment problem may be to increase the visibility of family and community medicine schools in the hope of attracting their students to the academic life; they may return to their communities of origin to take up academic obstetrics.

After five years of activity in a new school I am optimistic and excited and believe we can do a quality job and have a beneficial impact on the health care problems of women in our country.

Perhaps a short fable will emphasize the problems and opportunities. Not long ago the great education chameleon, academic obstetrics, was quietly comfortable in the knowledge that his descendants were increasing in numbers and erudition and that

TABLE 3. DEPARTMENTS OF OBSTETRICS AND GYNECOLOGY IN MEDICAL SCHOOLS IN THE UNITED STATES: ADDITIONAL FACULTY NEEDED BY 1984

	Obstetrics and Gynecology	Maternal and Fetal Medicine	Gynecological Oncology	Reproductive Endocrinology	Other	Total
Faculty	251	170	112	124	51	708
Schools	98	102	85	91	31	119

SOURCE: R. H. Messer, W. H. Pearse, and J. G. Fielden, "Academic Manpower for Obstetrics and Gynecology," *Obstetrics and Gynecology*, 53 (1979): 649-952.

his influence was being felt throughout the land. AO, as he was known to his friends, received great satisfaction from the statistics released every year showing what a good job he was doing. Bearing a child had become much less risky; control of reproduction was a reality; and a great deal was being learned and taught about the care of women. AO had even gone beyond the steps of meiosis and mitosis and had generated offspring with distinct and heightened colors they wore much of the time—perhaps not as adaptable, but more visible and admirably suited to their specialized functions. At the same time, AO continued to beget those with traditional chameleon color changeability whom he urged to care for all the people; some he permitted to carry his banner. But this quiet contemplation of his own resplendent coat of many colors in the settings of his own choice was not to be. Word came down from on high that success meant more effort, and that none were to be denied the fruits of his labors.

Exerting all his skill he entered the community and discovered many wondrous things. His offspring were adaptable, but they showed many mutations. He encountered a new family practice chameleon, distinguished by his consistently golden skin, his friendship with internal medicine and pediatric chameleons, and his desire for knowledge only in outline form. While the quarters offered AO were adequate, they were often not luxurious, and on occasion his contributions were not only greeted unenthusiastically, they were even criticized. Knowing he had much to give and much to gain, AO assumed a variety of appearances while pondering what to do. At last he decided on what his mother and father, medicine chameleon and surgery chameleon, had told him to do long ago: adapt, innovate, change the form but not the substance, and continue to bring the message to all who may benefit.

A Major Clinical Service

Randall Bloomfield

A major clinical service is one that offers a large patient population the full range of skills and expertise that medicine can offer. From an academic standpoint this type of service provides its health professionals with a broad medical spectrum. This perspective is of great importance for students of obstetrics, which, despite our different disciplines, all of us are today. The Department of Obstetrics and Gynecology at Kings County Hospital in New York, which does the lion's share of clinical teaching at the Downstate Medical Center, qualifies as a major clinical service.

This institution, one of the largest general hospitals in the United States, began as an "almshouse," or country poor farm, in 1830. It now stretches over forty-one acres of the Borough of Brooklyn and is its principal receiving hospital. A quotation etched in stone on the wall of the main building of the hospital best describes the philosophy and the purpose of the institution:

> Let all who serve here remember this institution is dedicated to the care of all who are helpless and afflicted. This before all else.

The population of Brooklyn has been estimated as 2.6 million; its composition is approximately:

White	64 percent
Nonwhite	24 percent
Puerto Rican	10.4 percent
Other	0.9 percent

Currently the hospital has 1,460 beds, of which 1,090 are for general care. It has the usual vast array of medical specialties, subspecialties, and support disciplines that one associates with a major clinical service. The Obstetrical Service consists of twenty-two antepartum beds; eight labor beds; five delivery rooms; sixty postpartum beds; and twenty-two rooming-in bassinets. The Pediatric Service has eighty bassinets.

One entire floor of the Outpatient Department is used four days a week for obstetrical patients. An outreach clinic also contributes to the patient load.

The catchment area of Kings County Hospital covers approximately 1 million people. In 1978 admissions totaled 33,000:

Black	77 percent	25,500
Hispanic	14 percent	4,500
White	8 percent	2,600
Other	1 percent	400

In addition, 2,000 patients from outside Brooklyn were admitted:

Black	1,140
Hispanic	400
White	400
Other	60

An analysis of the patient population admitted to the Obstetrical Service in 1978 (4,444) revealed the following:

Black	83.8 percent	3,726
Puerto Rican	12.7 percent	563
White	3.3 percent	146
Asian	0.1 percent	6
American Indian	0.1 percent	3

The case load of obstetrical patients is of sufficient volume and variety to meet the educational needs of the student, resident, and faculty population. For 1978 there were:

Prenatal visits	23,819
Admissions	5,345
Postpartum visits	2,585

In 1978, also, the staff delivered 4,433 infants weighing over 1,000 g., with a perinatal rate of 14 per 1,000 live births, the lowest figure achieved by the service since 1973.

The variety can be viewed from several perspectives. There were 233 patients under age sixteen (5 percent); and 269 patients

over age thirty-five (5 percent). This enabled us to observe patients at both ends of the age spectrum.

From the standpoint of obstetrical complications we saw:

Preeclamptics	5 percent	214
Eclamptics	0.1 percent	5
Breech presentations	4 percent	167
Twins	1 percent	54
Patients with premature rupture of membranes	5 percent	241

There were 595 cesarean sections (13 percent), of which 355 (8 percent) were of a primary type. Among the medical problems were:

Diabetes mellitus	1 percent	55
Hypertension	3 percent	122
Drug use	1 percent	241

The medical faculty members who provide patient care and teaching for this service consist of four and one-half full-time equivalents for inpatients, for outpatients, and for the Emergency Room, respectively. These are supplemented by a rotating staff of forty-six voluntary attendings. There are, in addition, thirty-one residents and 110 medical students. The nurse-midwifery component consists of eleven teaching faculty; eight and one-half full-time equivalent practitioners; and sixteen nurse-midwifery students.

The teaching responsibilities of the medical faculty include rounds, conferences, seminars, and tutorial sessions. The service has the good fortune to have on the floor the services of an eminent physiologist, an acknowledged authority on the hypertensive disorders of pregnancy.

The subspecialty of maternal and fetal medicine has been advanced by a former chairman as well as by the current chairman. The proximity to Downstate Medical Center fosters an interchange of personnel and information that is crucial to education and research.

The training program for our residents is designed to provide

a comprehensive experience in the proper management of obstetrical patients. The learning goals include the demonstration by each resident of a progressive increase in knowledge and dexterity. During the four years the residents participate in the education of students as they rotate through the service.

The major portion of the residents' rotation on obstetrics—eleven out of seventeen months—is spent at Kings County Hospital. Throughout the three months on obstetrics during the first year, techniques of normal vaginal delivery, primary cesarean section, and normal ambulatory obstetrics are taught. In the second year they spend four months on obstetrics, with increased responsibility for the patient's antepartum care, monitoring her labor and effecting a proper delivery. The High-Risk Obstetrical Clinic is an important assignment; guiding the resident in this clinic are subspecialists in maternal and fetal medicine.

In the third year one month is devoted to obstetrics. The chief resident is also given independent surgical privileges, in addition to recording and grading the medical students during their clerkships. Rounds, conferences, and lectures by the faculty supplement the practical experience acquired by caring for patients.

Sixteen medical students are assigned for each six-week rotation during the academic year. Out of a total of thirty-three and three-quarter daytime hours during the week, eighteen and one-half are spent at the hospital. The time is divided between the clinic, the floor, grand rounds, and tutorial sessions. In addition, during that six-week period each student puts in an average of five nights on the labor and delivery floor. She he performs about ten deliveries during that rotation, and is also a second assistant at cesarean sections.

Over the last twenty-five years reports on a wide range of investigative efforts have issued from this institution. These include studies on hypertensive disorders of pregnancy; body fluid compartments; the placenta; obstetrical anesthesia; and sonography. It also served as the population base for two editions of a well-known textbook on obstetrics. Currently being pursued are studies on cord blood; pregnancy outcome after abortion; bereavement; and psychological studies of newborn infants.

The research possibilities of the service are many. There is the opportunity to do epidemiological and nutritional studies on the local black, Hispanic, and Haitian populations. (Many Haitians who are recent immigrants to New York have settled in Brooklyn.)

What do we at Kings County Hospital gain from this major clinic service? Our students see interesting cases of a variety of diseases. Furthermore, they observe several cases of a particular type, thus allowing them an insight into patient care and pathology. They are called upon to research the literature on the disease entity. Patients often have more than one disease, so the need for viewing the individual as a whole is impressed upon the students' thinking.

Our residents are exposed to a wide mix of complications and broad cultural differences, developing their skills in an atmosphere that demands of them a variety of responses; they become embryo surgeons, teachers, and administrators.

The broad spectrum of diseases has been a stimulus for faculty interest and involvement. The large number of patients in so many disease categories enables the investigator to gain access to a sufficient volume of medical information for analysis.

This is how an obstetrics department of a major clinical service attempts to meet the educational needs and aspirations of its medical school.

CURRENT RESIDENCY REQUIREMENTS:

The American Board of Obstetrics and Gynecology

J. George Moore

Since the American Board of Obstetrics and Gynecology was incorporated in 1930 over 18,000 obstetrician-gynecologists have been certified.[1] Since 1974 almost 400 candidates have been certified in the subspecialties of gynecological oncology, maternal-fetal medicine, and reproductive endocrinology. In 1977 recertification evaluations were offered on a voluntary basis to those who had been certified six or more years earlier. Tables 1, 2, and 3 indicate the activities of the board over the past five years.

The requirements leading to basic certification in obstetrics and gynecology can be delineated simply. In order to qualify for the evaluation procedure the candidate, after attaining the M.D. degree, must complete a progressive, accredited program of postgraduate education of no less than four years' duration, including thirty-six months as chief resident on an obstetrics and gynecology service. The program director must attest that the candidate has satisfactorily completed the course. He or she must then pass the board's written (Part I) examination, practice obstetrics and gynecology with unrestricted hospital privileges for two years, and then pass the oral (Part II) evaluation, which includes a twelve-month case list, microscopic pathology, and gross demonstrations.

Qualification for subspecialty certification requires an additional two years of fellowship training in the specialty area (Table 4). This must follow basic residency training, but may be substi-

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TABLE 1. AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY, RESULTS OF EXAMINATIONS, 1974–78

	Written			Oral		
	Examined	Passed	Percent	Evaluated	Passed	Percent
1974	1,359	930	68	943	737	78
1975	1,329	1,013	76	1,026	768	75
1976	1,419	1,009	71	1,157	909	79
1977	1,426	947	66.5	1,121	825	74
1978	1,506	1,008	67	1,165[1]	737[1]	63[1]

Note: 1) Of the 1,165, 686 were evaluated in New York, and 421 (63 percent) passed; 499 were evaluated in San Francisco, and 316 (63 percent) passed.

tuted for the practice period required for basic board certification. The fellowship training must be approved by the specialty division in advance to ensure that it includes such requisite features as university sponsorship, the required university courses, laboratory experience, sufficient pertinent clinical material, and a faculty judged satisfactory by the division.

The candidate must then complete basic certification (oral evaluation), carry out two years of responsible practice in the subspecialty area, submit a twelve-month case list, and defend a pertinent thesis accepted by a journal with proper editorial scrutiny.

Recertification need not be mentioned further, other than to indicate that the procedure is voluntary. It may be taken at six-year intervals, requires the review of a year's practice activity, and

TABLE 2. AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY, CERTIFICATION IN THE SUBSPECIALTIES, 1974–79

	Gynecological Oncology	Maternal-Fetal Medicine	Reproductive Endocrinology
1974	66	16	22
1975	13	23	15
1976	23	29	13
1977	28	37	14
1978–79	31	44	22
Total	161	149	86

TABLE 3. AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY, RECERTIFICATIONS

	Applications	Recertified
1977	1,640	1,320
1978	1,944	1,442
1979 (as of 1 June)	673	—

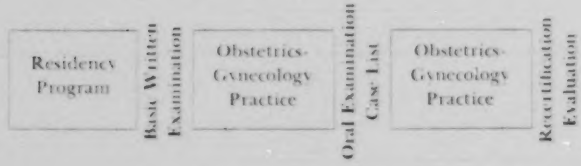
involves a written examination of subjects developed in large part during the previous five years.

Although the process of program accredition, accreditation of the individual candidate's qualifications, and the mechanics of certification may seem tedious in detail, they are indeed rather simple. The basic objectives are designed to ensure that the diplomate, initially at least, has the integrity and capability to provide safe patient care of reasonable quality and to perform satisfactorily at the consultant level.

Has this process achieved its objectives? Or, more succinctly, has the evaluation process assured the quality of the product?

TABLE 4. AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY, CERTIFICATION PROCEDURES

BASIC BOARD CERTIFICATION



SUBSPECIALTY CERTIFICATION

Answer: fairly well at the subspecialty level; only moderately well in basic certification.

Those of us who have given the basic examinations have more than occasionally come away with a feeling of uncertainty. We qualify the award of a "weak pass" with the rationalization that the candidate knows her his clinical limitations and is thereby safe. In past years, for example, we have seen fairly large numbers of foreign medical graduates (FMGs) with communication problems who seem poorly prepared, others who come from marginal residency programs, and still others who have merely filled a service function on the wards or in emergency rooms. This uncertainty may be dissipated as restrictions on FMGs are tightened, as marginal programs are aggressively weeded out, and as the board enlarges the scope of its oral evaluation and insists that those certified be fully capable of functioning at the consultant level.

There is little doubt that subspecialty certification has standardized and, in most cases, extended the training programs offered in the three designated areas—reproductive endocrinology, maternal-fetal medicine, and gynecological oncology. Indeed it has upgraded the knowledge, skills, and capability of those certified.

The programs are approved by the subspecialty divisions only after careful scrutiny. Site visits are made by specialists—not by retired administrators—and the products are carefully monitored.

Subspecialty certification provides a goal for residents-in-training as they aspire toward university posts, and, perhaps more pertinent, it requires that they at least be introduced to a program of research methodology. On the other hand, the general acceptance of subspecialty certification makes it more difficult for those trained as general obstetrician-gynecologists to obtain academic appointments or, once appointed, to advance.

Are there other areas or mechanisms for subspecialty certification? Such qualifications as the master of public health degree in family planning, and certification in gynecological pathology or gynecological surgery, or even gynecological urology, come to mind. Whether such subspecialty fellowships enhance or detract from basic residency training in the same institution is difficult to assess. Not infrequently the fellow in subspecialty train-

ing has difficulty passing the basic certification evaluation because of a deferred interest in other areas of obstetrics and gynecology.

These points are moot and require further investigation. There is no doubt that, as subspecialty certification became a reality, a substantial number of junior residents expressed interest in it; indeed a survey of junior fellows of the American College of Obstetricians and Gynecologists indicated that 30 percent wished to attain subspecialty certification.[3]

A point of great concern to all of us is the question of how board requirements influence young obstetrician-gynecologists as they make their role selection, that is, practice, academic medicine, clinical research, or administrative or institutional medicine. It is my personal opinion that the lock-step nature of the process (Table 4) is restrictive and that there is need for more flexibility. Under certain circumstances I can see the value of intermixing basic and subspecialty training programs and even certification procedures.

Need all reproductive endocrinologists, for example, require basic certification if they work in a cloistered setting? I think not; but the board has opted for procedural simplicity and completeness in requiring all certified subspecialties to first attain basic certification.

The board responded fairly promptly to governmental threats to restrict support of residency training programs by introducing the "broad approach to patient care" requirements.[3] The increasing and continuing need for clinical investigators and academicians justified a similar reaction by the board.[4] "Physicians in research become specialists" is a doctrine we are urged, unwisely I think, to resist, since the nation needs general physicians rather than specialists.

The board would do well to recognize that, however indirectly, its requirements *do* have an enormous influence on the young obstetrician-gynecologist in his or her choice of career roles. As a discipline, I submit it is hardly in our best interests, or that of patient care, to direct our residents specifically into general obstetrics and gynecology or to necessarily emphasize primary care. In the United Kingdom, for example, academic units are not so

strictly bound by National Health Service requirements, so the professor has more flexibility and greater influence in the training of an individual over an extended period of time.

It is just as logical and prudent, I believe, to encourage academic interests or clinical investigation by allowing credit for larger blocks of research training at all levels of basic and fellowship training. In academic and clinical research units we have encountered problems in providing academic perquisites in such areas as family planning, surgical gynecology, emergency medicine, and office gynecology. Such academic requirements embody in large part skills in clinical or basic investigation—skills that are strongly encouraged in specialized fellowship programs. As one of its adjuvant, if not primary, roles the board should recognize and encourage such training in its certification requirements.

NOTES

1. *Annual Reports* (Oklahoma City: American Board of Obstetrics and Gynaecology, 1974–79).

2. J. R. Trabin, W. H. Pearse, and R. Carter, "Subspecialization Manpower in Obstetrics and Gynecology," *Obstetrics and Gynecology* 51 (April 1978): 494-98.

3. *Annual Report of the American Board of Obstetrics and Gynecology* (Oklahoma City: American Board of Obstetrics and Gynecology, January 1979).

4. T. C. Chalmers, "A New Physician Manpower Shortage," *New England Journal of Medicine* 300 (10 May 1979): 1108-09.

5. F. N. Gurd, *Specialist Training in Britain, Report to the Royal College of Surgeons (Canada)* (Toronto: Royal College of Surgeons [Canada], 1975).

The American College of Obstetricians and Gynecologists

Warren H. Pearse

The topic "Current Residency Requirements" has been divided between J. George Moore, representing the American Board of Obstetrics and Gynecology, and me. In his chapter,

Moore addressed the issues of certification, and how these are designed to affect the education of residents, and evaluated the totality of that education and the early years of practice. We decided it will be my responsibility to describe the undergraduate-graduate medical education interface, the educational basics for an individual resident, and the number of residents involved. All of this material is factual, and our comments are more concerned with the state of the art than with philosophy or with peering into the future through a glass darkly.

The word "requirement" might mean several things, including quantity and quality of education; numbers of physicians needed to provide defined care; or the shibboleth "geographic and specialty distribution." Our focus will be on the first issue: the quality of the residency education process, with only brief comments on the number of physicians taking graduate training in obstetrics and gynecology. Complete background details are not necessary, and we will not attempt to provide them.

The focus of this conference is on academic medical centers—what used to be a medical school, pure, simple, one color, and functional, like a Model T, but is now a complex top-of-the-line, eight-cylinder, airconditioned, automatic transmission, six-miles-to-the-gallon academic medical center.

I do not believe there should be an academic-nonacademic distinction in residency education. Academic medicine serves to provide the prelude to and the support for our ultimate goal—improved practice of medicine and provision of health care. All residency programs, wherever located, should be of the highest possible quality.

All residency education in Canada is based in the sixteen existing medical schools. The 123 medical schools in the United States at present have direct responsibility for 117 of the 304 approved obstetrical-gynecological residency programs. Almost 150 other programs claim a medical school affiliation or vice versa, including military hospital programs. Indeed fewer than thirty of the 304 have no apparent university relationships, and most of these are clustered on the eastern seaboard. Let us not invoke

a town-gown or we-they approach, but accept the academic role for educational excellence in all specialty programs.

Let me proceed then to consider four items of concern:

- The undergraduate-graduate medical education interface.
- The basic residency requirements.
- Postresidency fellowships leading to subspecialization.
- The supply of residents in the specialty of obstetrics and gynecology.

TRANSITION FROM MEDICAL SCHOOL TO GRADUATE EDUCATION

The undergraduate-graduate medicine interface has been a troublesome one at least since World War II. The National Intern Matching Plan (NIMP), begun in 1953, worked well by teaming willing medical school graduates with eager hospitals for a one-year, usually rotating, internship. But more and more "straight" internships eventually appeared, and then came direct entry into first-year residencies, so that in 1968 the matching plan became the NIRMP—the National Intern and Resident Matching Plan. The very word internship was abolished in 1972 by a set of three new, first-year definitions from the AMA Council on Medical Education, and so, in response, in 1978 the matching plan became NRMP—National Resident Matching Plan.[1]

These changes came about as a result of many pressures that will not be detailed here, but it is safe to say that most of them arose from the new universality of several years of graduate medical education; from the push for education as opposed to service; and from specialty recruitment. It is equally safe to say that the new physician-consumer was seldom consulted as the changes were made, and that patient service gaps were often filled by a rising tide of foreign medical graduates (FMGs).

But the adage that today's problems are yesterday's solutions has been proven true again. In particular, the relative lack of availability of a broadly based first graduate year has had an impact both on specialties such as dermatology and neurology, which depend on that pool for recruitment, and on specialties that believe a general medical experience is desirable or manda-

tory before or during highly specialized residency training. The issue is exemplified in obstetrics-gynecology when the label of primary care specialty is adopted and verified by practice patterns, and when the American Board of Obstetrics and Gynecology recommends that "the candidate spend a significant portion of graduate education in a broadly oriented approach to patient care."[2]

BASIC RESIDENCY TRAINING IN OBSTETRICS AND GYNECOLOGY

The minimum graduate education requirement of the American board for those planning certification in the specialty is "not less than four years in approved clinical programs, with not less than 36 months of progressive responsibility for the care of obstetric and gynecologic patients."[3] The specific requirements for the content of residency programs should emerge from identified needs, which in turn should derive from a role definition of the practicing obstetrician-gynecologist five to ten years hence. This ideal scenario has not come to pass.

What has been done about role definition? There have been descriptive reports such as the Robert C. Mendenhall–University of Southern California study of specialist practice as it existed in 1977.[4] But even the data analysis of this study to produce a profile of the typical obstetrician-gynecologist has not yet been completed. The controversy over a primary care role as opposed to specialist practice persists, confounded by a whole spectrum of definitions of the term "primary care."

What about requirements? Beginning with a meeting in Tucson in 1974, sponsored by the American Association of Obstetricians and Gynecologists (Kennedy) Foundation, a set of educational objectives for residents in obstetrics and gynecology was developed.[5] Implementation was enhanced through workshops and a pilot study in 1975–76, followed by publication of the objectives in 1976. Over 10,000 copies of this report have been distributed to date; for the past four years a copy has been sent to each first-year resident in the United States and Canada. A revised second edition is scheduled for publication shortly. The American association has

given the responsibility for maintenance and distribution of the document to the Council on Residency Education in Obstetrics and Gynecology (CREOG). The objectives and examples represent the best judgment of experts concerning currently necessary knowledge in the specialty. Cognitive knowledge is easiest to agree upon; skills are more controversial, particularly the amount of surgical experience and the direct assumption of patient responsibility.

At the program level, as opposed to the training of the individual resident physician, the "general essentials" [6] for all graduate medical education are being rewritten by the Liaison Committee on Graduate Medical Education (LCGME), and a revision and expansion of the "special requirements" [7] for obstetrics and gynecology has been proposed. This would mean elimination of the quasi-official *Guide for Residency Programs*, which expands on the special requirements and provides guidance to residency program directors.[8] At this point, CREOG plans to develop a "Guide to Excellence in Residency Programs for Obstetrics and Gynecology." This document would go beyond statements of rules and minimums, and point the way to high educational achievement in all programs.

Approval of the quality of the overall residency program has been the function of the Residency Review Committee (RRC) for obstetrics and gynecology for the past twenty-five years, subject to review by the LCGME for the past five years. This has been a heavy responsibility, with gradual elimination of the weakest programs and consolidation of others—often with a medical school affiliation. The quality of programs has clearly improved, but, at the same time, the specialty has become far more complex, and achieving a top-flight education is more difficult.

The goal of a substantial number of residency programs has been to meet the published minimal standards; the challenge of excellence seems to have been met by relatively few. The further threat of programs being weakened by the imposition of subspecialty fellowships has produced general agreement that the fellowships should also be accredited by the RRC, and that the core residency must be able to stand alone.

SUBSPECIALIZATION

At the opposite end of graduate medical education, from the confused first year after award of the M.D. degree, is the all-too-clear subspecialty fellowship leading to an ABOG Certificate of Special Competence in gynecological oncology, maternal-fetal medicine, or reproductive endocrinology. The bounds of time do not permit any extended exposition here; the issues have been addressed in other publications.

As of June 1979, 396 obstetrician-gynecologists have earned subspecialty certification, a figure that represents about 2.6 percent of the 15,000 certified specialists.[9] This compares with approximately 35 percent of certified subspecialists in internal medicine, the usual target of attack in such discussions. The number of fellowships is not large, with about twenty physicians each year completing them in gynecological oncology, thirty-five in maternal-fetal medicine, and twenty-five in reproductive endocrinology. This total of eighty represents about 7 percent of the cohort of 1,150 chief residents. If a problem exists here it arises from the expectation, as identified by the ACOG junior fellows questionnaire, that 30 percent of first-year residents and almost 20 percent of finishing residents plan to subspecialize.

The statement from the report of the College Task Force on Special Competence aptly summarizes the issue:

> The physician with approved special competence training primarily functions in an educational, research, and consultative role. Increased numbers of subspecialists, beyond a level needed in consultation, teaching, and research, will result in fragmentation of the specialty, undesirable changes in practice patterns and a threat to the quality of patient care. The best interests of the patient and the specialty would not be served by additional divisions of subspecialty certification or large numbers of physicians in these areas.[10]

RESIDENT SUPPLY DATA

The CREOG data bank has supplied quite accurate data on individual obstetrical-gynecological residents since 1975,[11] flawed only by the confusion about defining who and what is a first-year resident.

TABLE 1. TOTAL NUMBER OF RESIDENTS IN OBSTETRICS AND GYNECOLOGY IN THE UNITED STATES (SELECTED YEARS)

	Approved Programs	Residents		
		American	Foreign Graduates	Total Residents
1963–64	483	1,923	534	2,457
1968–69	358	1,583	920	2,503
1970–71	350	1,588	1,067	2,655
1972–73	337	1,837	1,169	3,006
1974–75	346	2,308	1,113	3,421
1976–77	314	2,832	1,064	3,896
1977–78	308	3,177	1,051	4,228

Table 1 lists the total residents in obstetrics and gynecology over the past fifteen years. The number of approved programs has steadily declined, both through consolidation and loss of approval. While the number of American medical school graduates has been increasing since 1970, the number of foreign medical graduates (FMGs) has reached a plateau. Part of the apparent increase in total numbers is genuine, but a part comes about through the lengthening of residency programs from three to four years.

Table 2 reflects changes in the first-year resident cohort over the past ten years. The number of American graduates has more than doubled, while the level of FMGs has begun to drop sharply because of immigration restrictions.

TABLE 2. FIRST-YEAR RESIDENTS IN OBSTETRICS AND GYNECOLOGY IN THE UNITED STATES (SELECTED YEARS)

	American Graduates	Foreign Graduates	Total
1968–69	433	326	759
1970–71	543	314	857
1972–73	648	372	1,020
1974–75	742	288	1,030
1976–77	840	269	1,109
1977–78	900	240	1,140
1978–79	998	172	1,170

TABLE 3. FIRST YEAR RESIDENTS IN OBSTETRICS AND GYNECOLOGY IN THE UNITED STATES, AS PERCENTAGE OF GRADUATING CLASS (SELECTED YEARS)

	Total American Medical School Graduates in First-Year Residencies	Percentage of American Medical School Graduates in First-Year Residencies	Women as Percent of First-Year Residents
1968–69	433	5.4	±5.0
1970–71	543	6.5	—
1972–73	648	6.2	10.6
1974–75	742	5.8	13.4
1976–77	840	6.2	19.6
1977–78	900	6.3	24.8
1978–79	998	6.6	29.8

Table 3 demonstrates that much of the increase in the number of American medical school graduates entering the specialty is a reflection of the sharp rise in the annual number of graduates. Of key importance is the marked increase in the number of women—almost all American graduates—entering obstetrics and gynecology. At present about one in twenty practicing obstetrician-gynecologists is a woman; this figure could rise to one in five by 1990 if this trend persists.

SUMMARY

With the growing numbers of residents in obstetrics and gynecology and the changing patterns of practice, two truths emerge: first, resident education should be based on what the physician's practice will be, and, while long strides have been taken, this objective has not been fully achieved; second, there should be only one level of resident education, that of excellence; again, despite much progress, this goal has not been fully realized.

From the resident level, the now ordained physician moves to a fuller level of patient care and continued learning. A distinguished medical educator, Alan Gregg, once reminded us that: "A good education should leave much to be desired."

NOTES

1. *Directory of Residency Training Programs* (Chicago: American Medical Association, 1978).

2. *Bulletin for 1979* (Oklahoma City: American Board of Obstetrics and Gynecology, 1978).

3. Ibid.

4. *Obstetrics Gynecology Practice Study Report* (Los Angeles: University of Southern California, Division of Research in Medical Education, publication no. D-1066, 1977).

5. *Educational Objectives for Residents in Obstetrics and Gynecology* (Chicago: Council on Residency Education in Obstetrics and Gynecology, 1976).

6. *Training Programs* (See note 1).

7. Ibid.

8. *Guide for Residency Programs in Obstetrics-Gynecology* (Chicago: American Medical Association, 1976).

9. *Manpower Planning in Obstetrics and Gynecology* (Chicago: American College of Obstetrics and Gynecology, 1979).

10. "Report of the College Task Force on Special Competence," *ACOG Newsletter* (August 1979).

11. *Manpower Planning* (See note 9).

THE IMPACT OF REPRODUCTIVE BIOLOGY ON ACADEMIC OBSTETRICS:

The Viewpoint of an Endocrinologist

Ernst Knobil

No one in this audience needs to be convinced, nor even reminded, that the conglomerate of biological disciplines now known as reproductive biology is indeed the science basic to obstetrics and gynecology. One should be mindful, however, that the term reproductive biology means different things to different people: one thing to the endocrinologist; another to the embryologist; quite another to the geneticist; and still another to the practitioner of reproductive medicine. If one takes the long view, it would even seem at times that reproductive biology is synonymous with the whole of biology, a discipline no single individual can encompass at any but the most elementary level. I approach the subject as an endocrinologist, and will confine my remarks to that predilection.

The relationship between academic obstetrics and its basic science is a very special one, differing markedly from that of other areas of medicine and their respective conceptual underpinnings. This is because of all the mammalian organ systems the reproductive system and the control mechanisms that regulate it stand alone in having undergone major evolutionary adaptations that are rarely systematic and therefore quite unpredictable. The cardiovascular, renal, respiratory, and gastrointestinal systems are

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much the same throughout the mammalian species, and the lessons learned from the study of one species can generally be extrapolated, with but minor modifications, to all the others, including man. Not so, unhappily, for the physiological systems that govern reproductions.

Different mammalian species have evolved quite different control systems for the timing of ovulation to accommodate modes of reproduction varying from one brief period of sexual receptivity and one ovulation per year in some; to four-day ovarian cycles in others—cycles that proceed uninterruptedly until pregnancy supervenes; to yet others in which ovulation is triggered only when copulation, or a reasonable facsimile thereof, occurs. Among mammals, an intimidating array of mechanisms can be found for the control of the corpus luteum (CL), although progesterone is essential for pregnancy in all members of our class. Indeed the primary objective of reproduction, the delivery of a new individual to the extrauterine world, is initiated by what appear to be totally different mechanisms in different mammalian species.

Allow me to elaborate a little with a few familiar examples.

The rat is a favorite experimental animal in reproductive endocrinology, a field that owes a good part of its existence to the study of this species. It was perfectly reasonable to assume that this most convenient, uniform, and inexpensive beast was representative of all other mammals when it came to such a fundamental process as reproduction. I hasten to add that this assumption has been roundly justified, albeit with a few salient exceptions that have created great confusion among scientists and physicians alike for nearly four decades.

One case in point is the control of the CL. The ovarian cycle of the rat does not have a conventional luteal phase, although large, healthy-looking corpora lutea are formed after each ovulation. In 1941 E. B. Astwood reported his important observation that the CL of the rat does not become fully functional unless it is stimulated by the pituitary hormone prolactin.[1] This discovery promptly gave rise to the concept of a specific luteotropic hormone (LTH) that was viewed as a third gonadotropin, after luteinizing hormone (LH) and follicle-stimulating hormone (FSH). LTH was depicted in diagrammatic representations of the human menstrual

cycle as an arrow emanating from the pituitary gland telling the newly formed CL to produce progesterone. We all learned, and many of us taught, that prolactin and LTH were one and the same thing, and this schema still appears in some contemporary textbooks. Unfortunately, the belated study of a number of additional species, including man, eventually revealed that prolactin seemed to be clearly luteotropic only in the rat and mouse, and that the others had evolved an array of quite different luteotropic mechanisms.[2]

I might mention in passing that the higher primates are unique among the mammals studied to date in having a chorionic gonadotropin that prolongs luteal function in early pregnancy until the placenta can take over the secretion of progesterone. It is probably for this reason, among others, that it has taken so long for the physiological role of human chorionic gonadotropin (HCG) to be fully appreciated.

Another classic in reproductive endocrinology relating to the control of the CL is the finding by Leo Loeb in 1923 that hysterectomy in the guinea pig leads to the prolongation of the functional lifespan of the CL.[3] This observation was confirmed in a number of infraprimate species, and led to the notion that the luteal phase of the ovarian cycle was terminated by a uterine luteolytic factor, which, as one author put it, murders the CL. In the species so endowed the uterine luteolytic factor turned out to be a prostaglandin, which does in fact time their ovarian cycles.

It is astonishing to me that, considering the number of hysterectomies performed in the Western world, the role of the uterus in the control of the human CL was still being debated up to the present decade. It has now been demonstrated conclusively that in the higher primates perfectly normal ovarian cycles occur in the complete absence of the uterus. Nevertheless a major industry was constructed on the foundation of the uterine luteolytic factor, and many millions of private and public dollars were expended on the development of a luteolytic prostaglandin as a potential antifertility agent. To my knowledge, however, a luteolytic action of the prostaglandins has never been convincingly demonstrated in primates.

What then terminates the functional lifespan of the CL in

the higher primates? The most attractive hypothesis to date was proposed by F. Hoffmann, a German gynecologist, who unfortunately published his findings in a relatively unknown German clinical journal where they were buried for twelve years before being rediscovered in the early 1970s.

In brief, in a series of patients Hoffmann showed that the implantation of small amounts of estrogen in the CL-containing ovary markedly shortened the menstrual cycle. Much larger doses of estrogen implanted in the contralateral ovary or administered systematically had no effect. He concluded that the regression of the CL at the end of the menstrual cycle is normally initiated by the direct luteolytic action of estrogen that accumulates in the gland as the luteal phase progresses: ' a "self-destruct" mechanism, if you will. Hoffmann's early findings have since been corroborated, using more elaborate techniques for assessing luteal function, and his hypothesis has been supported by a number of studies primarily employing the rhesus monkey as an experimental model.[3]

One of the most brilliant chapters in reproductive endocrinology, which culminated two years ago in the award of the Nobel Prize in Physiology or Medicine to R. Guillemin and A. V. Schally, is based on the notion of a so-called ovulation center in the brain that triggers ovulation and times the ovarian cycle. The validity of this idea is inescapable if one considers the animals that ovulate only in response to the sensory stimulation associated with coitus: the reflex or induced ovulators. These sensory inputs impinge on the hypothalamus, where they cause the release of the neurohormone gonadotropin-releasing hormone (GnRH) into the pituitary portal circulation. This hypothalamic hormone then signals the pituitary to release a surge of LH, which eventuates in ovulation. This scheme occurs in the rabbit, the cat, the ferret, the camel, and some other species.

The rat, a spontaneous ovulator like the human female, is much more complicated. In this rodent a neural signal originating in the brain itself is required to trigger the hypothalamic discharge of the neurohormone that tells the pituitary to release the preovulatory gonadotropin surge. This neural signal is tightly

coupled to the diurnal light-dark cycle, and fires off at a specific time every day—the so-called critical period. As we well know, generations of physicians, investigators, and teachers have attempted in vain to explain the control of the human menstrual cycle in terms of the complex and elaborate control system that governs the ovarian cycle of the rat, because it was the only one reasonably well understood. And generations of students including my own, have been thoroughly confused as a consequence. In fact my current research program, which deals with the control of the menstrual cycle of the rhesus monkey, was initiated in no small measure by the frustration generated each year when I tried to understand the menstrual cycle in the light of the rat model before attempting to explain it to first-year medical students taking our course in physiology.

It appears that the higher primates do not have a cerebral clock that times ovulation, nor do they have a critical period: at the moment, all available evidence indicates there need not be a discharge of a bolus of the hypothalamic-releasing hormone to trigger the preovulatory gonadotropin surge. This seems to be accomplished by an action of estrogen directly on the pituitary. In other words the ovary, rather than the brain, is the timer of the menstrual cycle. In higher primates, which are characterized by being relatively uncoupled from the environment when it comes to the regulation of their reproductive processes, the hypothalamus seems to have lost its status as a controller; it has instead assumed a permissive role.[6] This new perception of the control of the human menstrual cycle should impinge on current efforts in contraceptive development based on the assumption that the hypothalamic control of human ovulation obeys the rat schema.

Finally, a brief look at the initiation of labor. The beautiful studies conducted by G. C. Liggins and his colleagues on the initiation of parturition in the ewe were launched by the observation that sheep feeding on a weed containing a veratrum alkaloid had greatly prolonged pregnancies. In fact they never successfully delivered live young, and often died in the attempt.[7] In this they resembled a herd of cows at the University of California at Davis, but their inability to deliver their calves was the consequence of

a genetic defect. In both instances it was found that the root of the problem was an incapacity of the fetal hypothalamo-hypophysial-adrenal apparatus to generate increased quantities of glucocorticoids as term approached. These findings, which were rapidly and easily verified experimentally, burst like a thunderclap upon the world of reproductive physiology. One of its greatest mysteries and most closely guarded secrets was finally revealed: it is the fetus, by increasing its secretion of ACTH and cortisol, that initiates parturition.

Briefly retold, the sheep model of parturition, as it has come to be called, goes something like this: an increase in fetal hypothalamic activity stimulates the secretion of ACTH, which signals the fetal adrenal cortex to secrete greater quantities of glucocorticoids. The glucocorticoids impinge on the endometrium, in a manner that remains to be fully elucidated, and there cause the increased production of prostaglandin $F_{2\alpha}$. This in turn acts on the myometrium, causing it to contract; delivery of the lamb follows. The elucidation of the mechanisms that initiate parturition in the ewe represents a brilliant exercise in physiological research that will surely withstand the test of time.

While the primate fetus, like its ovine and bovine counterparts, increases its production of cortisol when term approaches, it does not appear to play a critical role in the initiation of parturition in the human or in the rhesus monkey. This has been demonstrated most dramatically by several groups of investigators who removed the entire fetus from the uterus several weeks before term, leaving the placenta behind. The placentas were eventually delivered at the appropriate mean gestational time, but the scatter of the placental deliveries around this mean was greater than normal. It would therefore seem that, at best, the primate fetus may play a role in what J. R. G. Challis has termed the "fine tuning" of parturition.[3]

What then of the academic obstetrician and his basic science?

Whether or not one may wish to argue with Alexander Pope's dictum that "the proper study of mankind is man," using women, especially pregnant women, as experimental subjects for invasive procedures, is no longer an option—if it ever was. Nor am I sug-

gesting that investigation of reproductive phenomena relevant to the human be restricted to subhuman primates, in the belief that they are essentially diminutive people. Monkeys are marvelous models for the study of some phenomena, but totally inappropriate for others, forgetting for the moment that there is as much diversity within the primates as within the remainder of the mammals. The choice of experimental models is not at issue in this discussion. The point I wish to make is that academic obstetrician-gynecologists, if they are to advance their field on sound scientific footing, must be more resourceful, more perceptive, more thoughtful, and, above all, more critical than their counterparts in other fields of academic medicine. They must bring to bear on their investigations and those of their nonphysician colleagues much more of their knowledge and understanding of the human animal than is demanded of their peers in internal medicine, for example. They must be serious students of comparative physiology and comparative endocrinology. In other words they must be much more scholarly than their confrères. From what I have heard here, I trust that education of future academic obstetrician-gynecologists will fulfill these intellectual requirements.

NOTES

1. E. B. Astwood, "The Regulation of Corpus Luteum Function by Hypophysial Luteotropin," *Endocrinology* 28 (1941): 809-20.

2. E. Knobil, "On the Regulation of the Primate Corpus Luteum," *Biology of Reproduction* 8 (1973): 246-58.

3. L. Loeb, "The Mechanism of the Sexual Cycle with Special Reference to the Corpus Luteum," *American Journal of Anatomy* 32 (1923): 304-43.

4. F. Hoffmann, "Untersuchungen uber die hormonale Beeinflussung der Lebensdauer des Corpus luteum im Zyklus der Frau," *Geburtshilfe und Frauenheilkunde* 20 (1960): 1154-59.

5. Knobil, "Primate Corpus Luteum" (See note 2).

6. E. Knobil and T. M. Plant, "Neuroendocrine Control of Gonadotropin Secretion in the Female Rhesus Monkey," *Frontiers in Neuroendocrinology*, vol. 5, ed. W. F. Ganong and L. Martini (New York: Raven Press, 1978): 249-64.

7. G. C. Liggins, R. J. Fairclough, S. A. Grieves et al., "The Mechanism of Initiation of Parturition in the Ewe," *Recent Progress in Hormone Research* 29 (1973): 111-59.

8. J. R. G. Challis and F. A. Manning, "Control of Parturition in Subhuman Primates," *Seminars in Perinatology* 2 (1978): 247-60.

The Viewpoint of an Obstetrician-Biochemist

Kenneth J. Ryan

Intellectual ferment, social pressures, and opportunities for technology transfer have triggered revolutions of sorts in the fields of reproductive biology and academic obstetrics. These developments in the science of reproduction will be mentioned later, in defining the specific nature of the revolutions; it is worth considering, first, in a more fundamental sense, why they in fact have occurred.

The phenomenology of the upheavals can best be appreciated by a philosophical approach to the history of science, such as Thomas S. Kuhn's *The Structure of Scientific Revolutions*.[1] Kuhn suggests that a specialty or discipline can be characterized by its standard practices and theoretical beliefs. These he defines as a discipline's paradigms, its instruments of learning, teaching, and research. The scientific community in a given field learns its trade by studying, practicing, and trying to solve problems within the conceptual boundaries of its paradigms. A discipline's boundaries are, however, limiting. Because of this, socially and scientifically important problems may be relegated to another discipline, may be too problematic to consider, or may in any case be ignored. Revolution in science occurs when models must be changed because they do not meet problem-solving needs, and when existing concepts cannot explain new observations. The process may also be initiated when two different scientific communities look at a problem in common and their paradigms conflict. What may follow is a change in the approach to problem solving, or even a change in what is perceived as a problem.

The casually discovered fact—in contrast to that developed by experimental design—derived from a craft such as clinical practice also may play a vital role in the emergence of new models. When a new one is developed it can be recognized as such be-

cause the next generation's practitioners are attracted to it and the adherents of older models decline. The new paradigm that guides a field's research may also be identified by a new name, proclaiming it a science, such as reproductive biology, and laying claim to curricular time. The model is an object for the elaboration of additional facts, matching fact with theory and articulation of theory. Much of "normal" science after the revolution is engaged in tidying up. As Kuhn puts it: forcing nature into the preformed box of the paradigm. At this stage, science seems to progress rapidly because the scientist now concentrates on "problems that only his lack of ingenuity can keep him from solving."[2] The truly creative act was the revolution, the formation of the paradigm.

The impact of reproductive biology on the institutional and intellectual life—the *Zeitgeist*—of academic obstetrics has been just such a shift in paradigms. Reproductive biology has itself undergone changes over the past twenty-five years, fueled by advances in diverse areas of the general biological sciences that made this impact and technology transfer on obstetrics all the more dramatic.

REPRODUCTIVE BIOLOGY

Reproductive biology is in a sense a hybrid and derivative science that draws upon the tools and principles of the more fundamental fields such as cell biology, natural products chemistry, and molecular biology. The explosion in new knowledge for reproductive biology was possible only because of an influx of advances from these more basic disciplines; a movement into the field of scientists with a variety of backgrounds, including those interested in mammalian and human reproduction; and, most critically, a flow of new money prompted by social concerns over the population problem.

The record is clear on the role of the Macy Foundation in the 1950s in its support of research and training in reproduction, with an emphasis on its relevance to academic obstetrics. The Ford and Rockefeller foundations also launched major new

programs and spurred advances in reproductive biology. In addition, the formation of a new National Institute of Child Health and Human Development in 1961, a federal Center for Population Research, and the creation in 1968 of NIH-funded population center programs within universities all heightened the volume, the diversity, and the emphasis on human application of reproductive research programs.[4]

The consequences were dramatic: isolation, identity, and then clinical use of gonadotropins; the discovery, synthesis, and clinical use of hypothalamic-releasing factors; and the detailed description of placental, fetal, ovarian, and testicular endocrine functions, with applications in the clinical setting via improved assays of the steroid hormones and their metabolism. The introduction of the new concepts of receptor function in target tissues were soon applied to hormone-dependent human malignancies.

Other practical introductions were the discovery, characterization, and clinical utility of measuring human pituitary prolactin, the use of β-sympathomimetic drugs to control premature labor, and the understanding and control of fetal lung maturation in utero when early birth is anticipated. The latter achievement was an unexpected offshoot of studies on the control of the onset of labor in ruminants.[5,6]

We are on the brink of a new revolution with in vitro fertilization, embryo transfer, and genetic engineering. Probably nowhere in human endeavor has such fundamental biological information been transferred to common use so fast as in the field of reproduction—it rivals the space program in many respects. Underlying all this, however, was a major quest for the *perfect* birth control method, which still eludes us; and the moon shot has not come off completely as planned.

The birth control pill, the intrauterine device, and the use of prostaglandins in abortion, however, were either developed or perfected and put into clinical use during this era—no mean achievement. But in spite of all its successes, reproductive biology has had an identity crisis over its legitimacy in some academic institutions and scientific hierarchies because of the stigma of its goal-oriented research and derivative nature. In an elitist culture

reproductive biology is to pure science what obstetrics is to medicine: "inferior." The danger is that when the intense social pressure for problem solving and its attendant fiscal support are withdrawn, the scientific community may misjudge its inherent value to basic and academic institutions.

To return to our philosophical model, if the so-called pure sciences do not include the field of reproduction within their paradigms, its teaching and its research will more often than not be relegated to someone else or, more likely, allowed to languish. A more appealing process would be for it to take its rightful place with cellular and developmental biology as an academic discipline worth pursuing for its own sake.

ACADEMIC OBSTETRICS AND GYNECOLOGY

Although the impact of reproductive biology on obstetrics has been considerable, much of it has come from research and training within the clinical department itself. Of the sixteen NIH-sponsored population centers devoted to biological research in universities, many were organized by departments of obstetrics and gynecology.[7]

Reproductive biology became a useful and necessary basic discipline for academic obstetrics, and the technology transfer was facilitated. In some universities, such as Case Western Reserve, departments of obstetrics and gynecology were replaced by Ph.D.-degree-granting departments of reproductive biology of which the clinical field became one arm.[8] In other settings, divisions of reproductive biology or interdisciplinary laboratories with ties to obstetrics were developed. In any event the paradigms for obstetrics changed; critical factors were the NIH training programs, the fellowships, and student scholarships.[9]

Historically, gynecology has been a pure surgical discipline with anatomical pathology as its basic underpinning; obstetrics replaced midwifery first as a surgical and interventionist adjunct for complicated childbirth, with bacteriology as its basic discipline.

Advances in medicine and endocrinology applicable to both branches of women's medicine fostered a more general approach to health care when the two fields, obstetrics and gynecology,

joined. This was not a peaceful or unanimous transition because the elitism of these fields was clinical and practical rather than *academic*, in the sense that academic was believed to be learned but impractical. It is not universally appreciated that academic is not the antipode of clinical. The two have much to give one another, and their paradigms must be joined. Academic obstetrics, after all, includes the clinical pursuits of the field.

Other changes have taken place. Under the leadership of the Macy Foundation, physicians from outside obstetrics—medicine, surgery, and pediatrics, for example—were recruited to the field, and obstetricians were encouraged to pursue research training. Biochemists also were recruited into clinical departments to cope with laboratory needs and theoretical conceptualizations of widening horizons.

By 1973 the advances in reproductive biology, perinatal physiology, and gynecological oncology, and their application to patient care, prompted the introduction of advanced specialization requiring laboratory experience in the graduate training of obstetrician-gynecologists. The basic sciences became institutionalized as part of the discipline. Three paradigms with much in common emerged.

In the decade 1965–75 many new medical schools were established, the class sizes of schools increased on average by 50 percent, and full-time faculty in obstetrics by 100 percent. The volume of deliveries or of obstetrical beds did not change appreciably, while gynecological and, one presumes, surgical, beds doubled. During the same period there was a threefold increase in obstetrical teaching time for medical students outside the clinical setting. The number of students going into the field doubled, although it is unlikely that the percentage has changed much yet relative to other fields.[10]

A majority of professors of obstetrics and gynecology in 1961 believed they were recruiting their share of the talented pool of medical students, but a study refuted their complacency.[11] At that time there was little contact with students before the clinical years, basic science was not emphasized, and residency time for basic or clinical research was rare.

Eighteen years later some of this has in fact changed. The discipline is now suffering from its successes in making childbearing safer for mother and infant. Today a major thrust is for less intervention in pregnancy, and there is more suspicion of the technology and application that made success possible. One may hope that this is part of a review and selectivity by which technical advance is applied, but there is a clear need for more science, not less, in the practice of obstetrics. A true scientific review of the clinical field might well support a more natural obstetrical experience and less technical intervention.

REPRODUCTIVE BIOLOGY AND ACADEMIC OBSTETRICS AND GYNECOLOGY

A major impact of the basic component, reproductive biology, on its clinical arm, academic obstetrics, has occurred. The number and diversity of faculty has increased, and the paradigm of the changed disciplines allow more questions to be asked, more problems to be sought, and new tools and concepts to deal with a larger, but still cohesive, domain. The amount and diversity of obstetrical and gynecological teaching requirements have expanded for medical students and graduate trainees, and there is a wider constituency of students who may be recruited.[12]

This scientific revolution was achieved by an infusion of new types of physicians and biologists into the community of obstetrics and gynecology; by an infusion of new monies, which unfortunately is declining; and by intense social pressure to tackle new problems such as birth control and the quality of the birth and developmental processes.

A new revolution remains to be fashioned out of the conflicts between the momentum and technical imperative to create and change life, and the yearnings of many for a simpler approach to nature. The momentum of reproductive biology and academic obstetrics may lag if the perception that the population problem is solved gains wide acceptance. There is, in any case, a limitation of resources caused by inflation and the higher real cost of doing research, so that priorities must be ordered to have the greatest impact.

Recruitment of academic obstetricians would be helped by support of honors research programs in college; summer fellowships for medical students; and support for research fellowships in the residency years, as well as during the transition from post-research fellowship to the beginning faculty position. The clinical load of academic departments must be more creatively deployed.

Finally, it is important that reproductive biology be recognized in academic institutions by an appropriate organizational structure and support system. If a medical school has a department of reproductive biology, it is a little more difficult to ignore it in the allocation of resources and curricular time, and this is one academic pursuit that should not be ignored as it has been in the past.

NOTES

1. T. S. Kuhn, *The Structure of Scientific Revolutions*, 2nd ed. (Chicago: University of Chicago Press, 1970).

2. Ibid.

3. R. O. Greep, M. A. Koblinsky, and F. S. Jaffe, *Reproduction and Human Welfare* (Cambridge: Massachusetts Institute of Technology Press, 1976).

4. Ibid.

5. R. O. Greep and M. A. Koblinsky, eds., *Frontiers in Reproduction and Fertility Control* (Cambridge: Massachusetts Institute of Technology Press, 1977).

6. Greep, Koblinsky, and Jaffe, *Reproduction* (See note 3).

7. *Evaluation of NICHD Research Centers, NIH Evaluation Project* (Bethesda: National Institute of Child Health and Human Development, NICHD 77-1, 1978).

8. K. J. Ryan, "The Quantity and Quality of Human Life," *Case Western Reserve Medical Alumni Bulletin* 32 (1968): 4.

9. Greep, Koblinsky, and Jaffe, *Reproduction* (See note 3).

10. Ryan, "Quality of Life" (See note 8).

11. W. N. Spellacy, S. A. Birk, and W. C. Buhi, "A National Survey of Medical School Obstetrics and Gynecology Departments, 1965 to 1975," *Journal of Medical Education* 52 (1977): 901.

12. F. C. Taylor, Jr., ed., *The Recruitment of Talent for a Medical Specialty* (St. Louis: C. V. Mosby, 1961).

Discussant:

Seymour Lieberman

I, as a chemist, am aware that of all the people in this room no one knows less about obstetrics than I do. I have been associated with the Department of Obstetrics and Gynecology at Columbia since 1950, however, when Howard C. Taylor invited me to join his department. From my experiences since then I have formed some opinions about the subject that might be of interest.

We have heard from Kretchmer that he and the Macy Foundation are soliciting advice on how public funds could be employed to improve the intellectual atmosphere and scientific activities of departments of obstetrics and gynecology in our American medical schools. I shall try to address my remarks to that issue.

The title of this section is "The Impact of Reproductive Biology on Academic Obstetrics." For some time now I have been sensitized to the expression "reproductive biology," and I would like to explain why my objection to the phrase is relevant to the purpose of this conference.

Some years ago I was asked to speak about the role of the chemist in a department of obstetrics and gynecology. To prepare for the talk I read an entertaining book entitled *Obstetrics and Gynecologic Milestones, Essays in Eponymy* by Harold Speert. Although I was amused and instructed by its contents, I was surprised to discover there is in it very little mention of chemists, or even of chemicals. I found some fascinating accounts of scissors and saws, maneuvers and suspensions, forceps and dilators, rings and balloons, specula, crotchets, and incisions, positions and interpositions—but hardly a word about chemicals.

This led me to recall the many chemists who have made significant contributions to this field—some have even won the Nobel Prize for their efforts. In the second and third quarters of this century chemists isolated and identified the steroid hormones and made them available inexpensively by their ingenious

syntheses; they fabricated synthetic analogues that often represented an improvement upon nature; they studied the metabolism of these hormones, and the results made diagnosis more secure and often provided scientific understanding of many disease states; they isolated and made available the gonadotrophic hormones, and devised methods for the radioimmunoassay of them and of the steroid hormones; they discovered the receptors, the existence of which is essential for the expression of the biological activity of the estrogens, progestins, and the protein hormones; and they are even now coming closer to explaining in chemical terms the mechanisms by which these hormones regulate reproductive processes.

I have no doubt that everyone here will agree, therefore, that the role of the chemist in the modern development of obstetrics has been substantial. I dwell on this self-evident point because, as I said, I have been sensitized to the expression "reproductive biology," an expression customarily used to characterize those activities of the nonclinical sciences that contribute to the discipline of obstetrics. I am unhappy with that expression because its use tends to turn away those scientists, who, because they do not consider themselves biologists, do not recognize their potential as contributors to the subject. Not only people who are trained as chemists, but physicists, engineers, mathematicians, and others have made and can be expected to make important advances to this field. To use the expression "reproductive biology" tends to discourage them from applying their talents to the solution of the problems we are interested in. As a result, I am waging a campaign to replace the phrase "reproductive biology" with "reproductive sciences," in order to emphasize the fact that the techniques and thought processes of many natural sciences are applicable to the study of reproductive phenomena.

The plain fact is that only a small fraction of students currently studying chemistry—biochemistry, organic, or other branches of the science—are preparing themselves for a career in this area, where their efforts can influence the future well-being of the world community. An inappropriate term may drive them away; a better-suited one may captivate them. If

nonclinical scientists do not identify themselves with the field because of the name applied to it, they are not going to be attracted to it.

Most biochemists who hold administrative posts or full professorships have made their fame and have achieved their positions by their success in areas unrelated to our discipline. Their interest in reproductive science is usually not intense, and since there is a tendency for students to ape their professors, little encouragement to enter this field is being extended to graduate students in biochemistry. As it is, science travels in accordance with fashion, and reproductive science is not now fashionable among the leaders in biochemistry.

Earlier we heard that there are 123 medical schools in the United States. We also heard Jaffe's account of the academic activities of the Department of Obstetrics, Gynecology, and Reproductive Sciences of the School of Medicine of the University of California, San Francisco, of which he is chairman. What Jaffe described must characterize one of the best departments in the country. In fact, if all our departments of obstetrics and gynecology had programs equal to the one he described there would be no need for this meeting. No tinkering with the intellectual health of obstetrics in the United States would be required.

But we all know that the picture Jaffe painted for us is not representative of all departments. Perhaps ten or, at the very most, twenty departments around the country have programs comparable to the one at UCSF. The remainder are scarcely in the same league, and it is to these that attention should be paid. The best departments can serve as models, but concentrating attention on them alone may not develop the recommendations that can result in upgrading the less outstanding. My remarks will be directed at some of the issues raised by Ryan, Knobil, and others, which might deserve further consideration.

My first recommendation concerns the suggestion that one solution to the problem is to identify and employ triple-threat men—individuals who, because they have the characteristics of great clinicians, scientists, and educators, will help lead the laggard departments to a bright future. My suggestion is: dispel

the notion that our agonies can be remedied by triple-threat men. There may be a remote possibility that such people exist, but a viable program cannot be founded on such a tenuous assumption. The idea that one person can embody the characteristics of a great clinician, a productive, innovative scientist, and an inspiring teacher is antiquated. Modern science is too complex and too important to be left to the dabbler and the dilettante.

To be productive in modern-day science is a full-time job. Most of us find there are too few hours in the day to merely keep abreast of developments in our own narrow alley of science. Likewise, great dedication is demanded of all good teachers, and we all know commitments are required to become an expert physician and surgeon. If the way to improve the academic status of obstetrics is through science, then I suggest we not settle for casual solutions. It would seem more profitable to accommodate to present-day realities by addressing our thoughts and actions to devising mechanisms through which specialists become engaged in the uplifting process.

Most mechanisms that come easily to mind have an illusory quality. Current political, societal, and financial trends militate against the facile establishment of procedures that would tend to improve academic status. Nevertheless it is our purpose to examine the problems and propose solutions, even those of doubtful acceptability. For example, the employment of scientists—M.D.'s or Ph.D.'s—on a full-time basis would be a step that would tend to elevate the academic environment in departments of obstetrics and gynecology. This is being done by all of the model departments, and if it could be extended to some of the other American medical schools, a net increase in scholarly spirit would undoubtedly result.

Some chairmen, however, have complained that they cannot afford the luxury of having full-time research scientists associated with their departments. They have to settle for what are, in essence, triple-threat individuals who earn the bulk of their salaries through their activities as physicians. Even if they exist, such paragons would have to be willing to make sacrifices, for under such a plan their incomes would undoubtedly suffer. If these individuals are talented enough to be triple-threat men,

why expect them to be so foolish as to place themselves and their families at a disadvantage? Science and scholarship are too important to be dependent on so evanescent a base. The military men learned this lesson long ago; they do not fight wars, or even prepare for wars, with picayune techniques. Why should we, the scientific and academic community, settle for insignificant solutions?

In this connection there is one worthy, not too unrealistic, practice that ought to be encouraged: the creation of stable career tracks for Ph.D.'s who occupy posts in clinical departments. One of the great triumphs of Columbia's College of Physicians and Surgeons was the creation in 1928 of a system of joint appointments that made possible, and even encouraged, the engagement of nonclinical scientists in clinical departments. By means of this formal arrangement, these departments were able to develop appropriate scientific endeavors with professional expertise, and at the same time enlarge their scholarly and pedagogical capacities. I am sure all our model departments of obstetrics have similar arrangements. The academic status of obstetrics would certainly be enriched if some of the other departments in the country could be induced to implement procedures that would permit nonclinical scientists to play a role in achieving departmental objectives.

Such arrangements are, however, not established easily. No proposition that requires the bridging of departmental boundaries, and that is therefore perceived to be a threat to departmental prerogatives, can, in the real academic world, be implemented without anguish. Yet the rewards are great—some of the greatest scientists at Columbia were denizens of such chairs—and administrators who realize that the benefits are worth the trouble can improve the academic status of their institutions by this method.

As a final point I would bring up for consideration the suggestion that the academic status of departments of obstetrics and gynecology might be elevated if the governance of the departments were modernized to conform to the demands of the present day, and, more particularly, to accommodate to the needs of modern science.

Consider for a moment what characteristics a modern chair-

man of a department of obstetrics ought to possess. The list is long and few persons are so well endowed—in fact, anyone possessing all the necessary qualifications might well be called a "Walter Mitty." To begin with, the chairman must be a good administrator; they are hard to come by, but when one is found he ought to be nurtured. A large organization needs a disciplined, systematic, mature personality as its leader, for the job is arduous. But the chairman must also be a scholar, an occupation most scholars find to be a full-time activity. At some time in his career the chairman should have been a scientist, for how else could he have accumulated the long list of publications that are a requirement for this post in any good medical school. It goes without saying that the chairman must be a superb clinician and surgeon, essential accomplishments if he is to be the headmaster of experienced obstetricians and gynecologists.

The chairman must be a dedicated teacher, a skillful writer, a spell-binding orator, and perhaps even a showman. One of his attributes must be good taste, a quality that is evident most dramatically in his choice of faculty. Recruitment is an important and time-consuming responsibility that can sometimes determine, more than any other, the chairman's place in history. The chairman should have talent as a fund raiser, and perhaps as a manipulator of funds, as I am sure you all know. (There are some who contend that if the chairman is a financial wizard it is not necessary that he have any other academic attributes.) Moreover, it is essential these days that the chairman be aware of the availability of funds from the government and from various foundations and private donors. In the modern era he ought also to be an expert in family planning matters, community medicine, and medical ethics. For a chairman who would be a leader of his department, is this not a worthy, albeit a full-time, occupation?

Another important job that devolves upon a departmental chairman in a large medical center is that of hospital planner. Alterations are being made continuously; plans that project twenty or even fifty years hence are frequently under discussion, and these demand the attention of the chairman, whose wisdom and experience can determine the future character of the institution.

Finally, the chairman needs to be a politician or, perhaps better, a diplomat. Universities, medical schools, and hospitals can be considered to be collections of committees, most of which are so vital to the operation of the institution that only the most powerful and experienced members of the community qualify for membership. An effective chairman does not avoid service of this kind, either because his nonparticipation in such activities will be of disadvantage to the interests of his domain or because he simply does not want to be left out of the power structure.

There may be other functions a chairman has to perform, but this list is sufficiently long to make it clear that a head of a modern department of obstetrics and gynecology does indeed have to be a Walter Mitty in order to serve effectively in all the necessary realms. Considering how few individuals can qualify as such paasters, is it any wonder that there are probably fewer than twenty model departments in the country?

Earlier, Moore outlined the current requirements for specialty training in this discipline. Does satisfying these requirements prepare anyone properly for the job of a modern chairman, or even for the role of a modern academician in reproductive science and medicine?

Of course there are great leaders, people whose natural talents enable them to understand and control the present and to discern the future. But the fact is that an administrative arrangement that relies on only these few virtuosi will probably not result in improvement of the academic status of obstetrics in most medical schools of the country. The enterprise is too large and complicated for the traditional pattern of governance to be effective.

Grobstein pointed out that departments of obstetrics and gynecology are relegated to the pits in most medical centers around the country. To elevate their academic status, courageous actions may be necessary. I wonder whether a critical examination of the manner in which these departments are governed would lead to rational suggestions for improvement.

The Impact of Perinatology on Academic Obstetrics

Jack A. Pritchard

Until a few years after World War II the intrauterine sanctuary of the embryo and fetus was held to be inviolate. The expectant mother was the patient to be cared for, whereas the fetus was but an appendage, albeit a transient one. The philosophy prevailed that "good maternal care" would automatically provide what was best for the product of conception. Ideally, labor would not occur until the fetus weighed more than 2,500 g., which was the widely accepted definition of fetal maturity, except in the case of grossly abnormal development: then it was hoped that the embryo or nonviable fetus might be expelled spontaneously. If, however, spontaneous abortion did not ensue, society decreed the only alternative to be that the parents, or at times some governmental agency, must try to care for the subsequently live-born but severely malfunctioning individual.

During this same era there was considerable emphasis in most academic institutions on consolidating care of the woman's reproductive tract under one "completely trained physician." That specially trained individual—called variously the obstetrician-gynecologist, the gynecologist-obstetrician, or simply the gynecologist—would provide such care, be it the management of eclampsia or the treatment of cancer of the cervix. As one consequence, much of the surgery performed on the reproductive tract by general surgeons and much of the obstetrical care provided by the general practitioner was performed by this individual who specialized in problems involving the female reproductive tract. As another consequence, practically all babies were born in hospitals. Home

delivery, as a planned event under the supervision of a physician, essentially disappeared. As a further consequence of the evolution of the woman's specialist physician, care of the newborn infant was no longer the task of this individual. Instead, the pediatrician was now delegated to care for the newborn. About the only major question was: "How soon after the birth of the infant would the pediatrician become responsible?"

The typical academic department of obstetrics and gynecology was small. Its chairman was expected to be knowledgeable about all problems involving the woman's reproductive tract, including reproduction, even though, more than likely, his principal personal clinical concern was gynecology. (If for no other reason, gynecology provided for a more orderly life that was compatible with other pursuits, including local administration and travel to national and international meetings.) Few departments were chaired by individuals whose major interest was obstetrics. As Taylor emphasized, the chairman professed obstetrics, but practiced gynecology.

In departments of pediatrics the number of faculty, typically, was appreciably greater than in departments of obstetrics and gynecology. Rarely, however, were the problems of the newborn infant of major interest to the chairman of pediatrics or to most of the faculty. During this time academic departments of obstetrics and gynecology usually had difficulty in recruiting individuals for residency programs and in recruiting faculty, even though most medical students greatly enjoyed their clerkship experiences in obstetrics, which often was their first active participation in clinical care. At the outset, observing what they considered to be the origin of life—the birth of a human being—was quite stimulating. The mystery of birth soon became not so intriguing, however, leaving messy, often intellectually demeaning, work and long hours as the ultimate residuum of this experience. Typically, the students' enthusiasm waned, to the extent that very few who were quite intrigued early on elected subsequently to train in obstetrics and gynecology.

The instruction in obstetrics can be faulted. For example, the origin of this presumed new life—namely, the whole period of

fetal growth and development—was essentially ignored. Even the medicine men of the ancestors of the Hopi Indians created and sustained more interest in their origin when they described man developing deep in the earth, and subsequently appearing on the earth's surface through a mysterious hole in the ground—the Sipapu.

The rapid increase in the world's population generated considerable concern in the United States and elsewhere. The remarkably reduced birth rate that followed was dramatic. Some medical educators interpreted the falling birth rate as another major wound to obstetrics, and one from which recovery was unlikely. I clearly recall making a site visit to one medical school to evaluate a training grant and being told by its dean, a noted educator, of his concern for the many obstetricians who would rapidly become superfluous. He had in fact been contemplating methods by which the obstetrician might be "retreaded" so as to be able to provide some other kind of service. Even the *Wall Street Journal* warned medical students of the inevitable atrophy of obstetrics that must follow the falling birth rate.

Fortunately this low point in the era of specialized care for the mother, fetus, and newborn did not persist. The newborn infant came to be recognized as an individual entitled to optimum care, however that was defined. Of great importance, it became more fully appreciated by obstetricians, and generally recognized by pediatricians, other health scientists, and even the lay public, that there was life before birth! Not only was there life before birth, but the growth and development of the fetus very likely was influenced in utero either favorably or deleteriously by myriad factors yet to be recognized.

As Hellman has reminded us, stimuli for basic research and training in reproductive biology, with considerable emphasis on the fetus and the newborn infant, were provided especially by the National Institutes of Health (NIH), first through the establishment of the Human Embryology and Development Study Section, and not long thereafter by the creation of a new institute, the National Institute of Child Health and Human Development (NICHD). Unfortunately the name bestowed upon the new insti-

tute did not proclaim what was becoming widely recognized as an area of research with tremendous potential for the betterment of mankind, namely, the growth and development of the embryo and fetus, and the successful transition from fetus to a newborn infant who would subsequently thrive. Of considerable importance in the establishment of the NICHD was an awareness by Congress of the mediocrity of the health care of the fetus and newborn infant as exemplified, in part at least, by the high perinatal and infant mortality rates in this country compared to those of other developed countries.

As knowledge of the fetus grew rapidly, the concept of fetal medicine as a clinical and research discipline evolved. The obstetrical specialist no longer could be content with being just the physician to the mother; she he must also become the physician to the fetus, and practice maternal *and* fetal medicine.

As the concept of the fetus as a patient and, in turn, the discipline of maternal-fetal medicine has evolved, the organizational structure of most traditional departments of obstetrics and gynecology has changed appreciably. The chairman of an academic department of obstetrics and gynecology is no longer likely to be the head of a small faculty that he attempts to lead personally, by precept, into the interstices of the many diversified arenas of clinical care, teaching, and research that pertain to the female reproductive tract. Instead, individuals with special skills and desires are given such responsibility, be it maternal-fetal medicine, gynecological oncology, or reproductive endocrinology. This departmental compartmentalization by subspecialties, with maternal-fetal medicine as one major compartment, certainly has provided the potential, at least, for better care, better teaching, and better research.

For academic departments of obstetrics and gynecology the scope of maternal-fetal medicine, especially, when vigorously exploited from the standpoint of research, training, provision of ideal care, and economics, is proving to be a challenge of great dimensions. To be able to optimally conduct research and training and provide care, some of the essential ingredients for a successful division of maternal-fetal medicine include sonography, genetics,

specialized anesthesiology, microbiology, pathology, endocrinology, fetal physiology—with the capability for studying appropriate laboratory models—biochemistry, epidemiology, and, of course, neonatology. Few, if any, academic departments of obstetrics and gynecology have been able to establish expertise in all of these areas. Special competence appropriate for the investigation of fetal growth and development and for the care of the fetus is, however, available through other departments in some institutions.

A model for research that gives every indication of functioning in a very productive way has been developed at the University of Texas Health Science Center at Dallas. There the Cecil H. and Ida Green Center for the Study of Reproductive Biology Sciences has been established under the direction of Paul C. MacDonald, formerly chairman of the Department of Obstetrics and Gynecology, who is extremely well qualified as a clinician, investigator, trainer, and administrator. Parenthetically, while MacDonald appears to differ from Lieberman's description of a scientist, it should be pointed out that he received his scientific training under Lieberman, who, I am sure, would categorize MacDonald as a first-rate scientist.

The center is contiguous with the Department of Obstetrics and Gynecology and the operations of both are intimately entwined. All members of the professional staff of the center have academic appointments in the department, and often in a basic science department also. There are three tenured, internationally recognized members of the center and the department who have Ph.D. degrees, and six other very productive individuals with Ph.D.'s.

The impact of the center, functioning in collaboration with the Department of Obstetrics and Gynecology, has been to amalgamate the interests and skills of a variety of talented, prestigious individuals who are attacking important, often profound issues, especially those concerned with the fetus. The amalgam for the successful operation has been very strong leadership, an excellent record of productivity in terms of both research and research training, and a degree of fiscal stability. Financing is provided from university funds, from private endowment, and to a considerable

degree from the NIH, especially a grant from the NICHD to study parturition.

There are other excellent models—the one described by Jaffe, for example. Support is urged for those centers now operational, and for the creation of other similar, but not necessarily identical, centers.

Pragmatically, compartmentalization of departments of obstetrics and gynecology and, especially, the establishment of divisions of maternal-fetal medicine has created or aggravated a number of problems and raised several difficult questions.

One major question is: How intensive should fetal and neonatal care be in order to insure with reasonable certainty a healthy offspring? The public has demonstrated an awareness and a concern over the previously high perinatal and infant mortality rates already described—witness their support of Congress, and, in turn, the support by Congress of the NICHD.

Nonetheless, the members of our society who are most intimately concerned with reproduction, namely, pregnant women, question the need for some facets of fetal medicine as now promulgated and practiced by the majority of academic institutions. More vociferous groups of parents emphasize that human reproduction is a normal biological function, and that, in general, pregnancy, and especially parturition, need not be embellished with a profusion of space-age equipment that is expensive, cumbersome, distracting, and that may lead to harm rather than promote good. Moreover, the inability to demonstrate convincingly to the public that several techniques now widely used during pregnancy and parturition are mandatory for an excellent outcome, that is, a newborn infant who subsequently thrives, is currently tarnishing the image of maternal-fetal medicine and of academic obstetrics. This is a problem amenable to studies, if they are well organized, carefully implemented, and objectively interpreted.

Another important question is: What advanced training should the specialist in maternal-fetal medicine have, beyond that provided by the usual residency training as established by the specialty board in obstetrics and gynecology? While this question continues to receive considerable attention, particularly from

members of the subspecialty board of maternal-fetal medicine, a crisp answer is not yet forthcoming. Part of the difficulty resides in the lack of a clear job description for the specialist in maternal-fetal medicine. For example, in high-risk pregnancies as the consequence of maternal disease, how should this specialist relate to the specialist in obstetrics and gynecology, to the internist, to the surgeon, and to the neonatologist? Typically, should the subspecialist in maternal-fetal medicine care directly for the high-risk pregnancy, or should she/he try to fill the role of the fountain of wisdom sought out by colleagues in a problem case, and serve as director of the activities of all of the other physicians who might be involved in the management of the mother, the fetus, and perhaps the newborn infant? Until a job description is forthcoming, the question of the number of subspecialists who should be trained in maternal-fetal medicine cannot be answered.

Another important question is: Should advanced training in maternal-fetal medicine be limited to the development of skills that have immediate clinical utility, or should the trainees also develop skills that will allow them to carry out productive investigations in this critical arena where so much remains to be learned? Intimately related to this question is another troublesome and yet generally unanswered one: Who should support the individual during the time of advanced training in maternal-fetal medicine? Essentially all training grants provide support for training in basic research rather than for the acquisition of clinical skills. Who will support the trainees while they do both?

Many institutions can point with considerable pride to a remarkable decrease in perinatal mortality following their implementation of academic programs in maternal-fetal medicine and neonatology. At the University of California Medical Center at San Diego, for example, after the establishment of a neonatal intensive care unit in 1968 the perinatal death rate fell from 34 to 25 per 1,000 live births, and after the establishment of a division of maternal-fetal medicine in 1973 it fell further, to the remarkably low current level of 10.6 per 1,000. The decrease must have been due, in part at least, to the presence of fellows who provided personal expertise that was not previously available. Should a fee for service be collected for the fellows' contributions to care?

Realistically, part of the answer to yet another important question—Who should train the specialist in maternal-fetal medicine?—is obvious: an academic department of obstetrics and gynecology that has or can somehow acquire sufficient funds to do so. At this time there are departments of obstetrics and gynecology that possess appropriate clinical material and clinical expertise for pragmatic clinical training, yet cannot necessarily provide a research experience of any substance. There are other departments for which the reverse is more likely to be true. Should the virtues of both kinds of departments be paired and exploited for training, or is such a "joint venture" likely to prove to be inefficient in terms of time, expensive in terms of geography, and perhaps schizophrenic in terms of emotion?

Another question has arisen, perhaps for no other reason than the traditional American phenomenon of "keeping up with the Joneses," namely: Is an academic department of obstetrics and gynecology likely to continue to be judged as acceptable for providing good general training for residents in obstetrics and gynecology and appropriate education for medical students if it is not also approved for training in maternal-fetal medicine?

So far, at least, the fear that the creation of subspecialties in obstetrics and gynecology, especially of maternal-fetal medicine, would create a troublesome backlash does not appear to be justified. The question not yet resolved, however, is: Will further stratification of care of the mother and fetus, with the regularly trained obstetrician-gynecologist playing a more subordinate role, discourage individuals from choosing this specialty? If the answer is "yes," academic obstetrics and gynecology will surely suffer.

As I bring my remarks to a close, I have a feeling of nonaccomplishment. For example, I have so far deliberately avoided defining and, for the most part, using the key word in the title: "perinatology." Perinatology is derived from "perinatal," which means "around the time of birth." While this is a critical period, it imposes undue temporal restrictions from the standpoint of the problems of pregnant women and their fetuses. Moreover, with possible rare exceptions, there is no such person as a perinatologist in academic institutions. Today obstetrical care is provided by the physician who cares for the mother and fetus before and during

birth; the neonatologist cares for the infant from the time of birth. Neonatology, that component of perinatology concerned specifically with the infant after birth, most often has long been beyond the administrative and functional jurisdiction of academic departments of obstetrics and gynecology.

Thus in many academic institutions a formidable administrative dichotomy exists between neonatology and health care for mother and fetus, whatever the latter is called. Consequently I believe there is another important and most provocative unanswered question: Would the fetus-infant and the mother fare better, in some circumstances at least, if neonatology were under the aegis of the department of obstetrics and gynecology rather than of the department of pediatrics?

Correct answers to these questions are important to the viability of obstetrics and gynecology as a specialty and maternal-fetal medicine as a subspecialty.

Discussant:

E. J. Quilligan

It would seem that we have several fundamental areas to consider, many of which Pritchard has discussed. I would like to limit my remarks to two: 1) recruitment into the specialty; and 2) the effect on training programs.

Recruitment into obstetrics has faced many difficulties. A study several years ago by Taylor revealed that the average individual entering the specialty was from the lower one-third of his/her medical school class. Another study by F. P. Zuspan for the Association of Professors of Gynecology and Obstetrics indicated a considerably improved posture in terms of students with a higher class standing entering the field. I have no data to prove it, but I believe some of this change was brought about as a result of the

development of the subspecialties. While the improvement occurred long before the American boards had subspecialties, I hasten to point out that the subspecialties existed long before the boards recognized them.

The subspecialties were created because a body of knowledge was developed that constituted a suitable base for a career in research, teaching, and patient care. The body of knowledge was accumulated by individuals trained in research who could obtain grants with relative ease—the so-called "golden area of research." I think all of us would agree that the golden age of funding is a thing of the past, and this leads to one of Pritchard's major questions: How will departments fund the training of individuals interested in a career in maternal-fetal medicine?

It seems to me there are only three fundamental choices: the sick patient, society at large, or the trainee. I would judge it fundamentally unfair to expect the patient to pay for this type of training through increased hospital costs. That leaves society or the trainee. Giving graduate students the opportunity to finance this aspect of their education would certainly reduce the number of candidates to those with an intense desire for subspecialty training; we have had such individuals in our program. This hardly seems acceptable, however, since many candidates are already deeply in debt when they leave medical school. The remaining source of funds, then, is society, through training grants or, at the very least, payments to the trainees from Titles 18 and 19 funds for the inevitable patient care the trainees provide. This will entail a much sharper definition in all our training programs of what is training and what is patient care.

The second area I would like to comment on is the effect on our training programs. In order to determine this one must first define the product being trained. As Pritchard said, this has been poorly done; I can't presume to do it any better, but I will try.

To simplify, I would state that the product is an individual who acts as a consultant on high-risk pregnancy problems; a consultant, at the very least, gives advice and may even be asked to assume complete management of a case. This leaves the definition of high-risk pregnancy, which I feel is like defining "beauty is in

the eyes of the beholder." For example, premature rupture of the membranes is a high-risk pregnancy for the fetus, demanding the care of the most competent neonatologist in a well-equipped, high-risk nursery. Any good obstetrician can handle the obstetrical side of the case, however. In yet another high-risk situation—class D diabetes in the mother—the combination of an expert in maternal-fetal medicine, an internist, and a neonatologist may be needed to work in close concert to achieve a satisfactory result.

If you accept my definition of a maternal-fetal specialist as primarily a consultant, then it is easier to analyze the effect on the service of training such an individual. The principal problem faced in many training programs is the lack of an adequate patient load for teaching purposes. In the case of training a consultant, we have the first-year fellow work with the full-time staff man as a preceptor, and the second-year fellow work as the junior staff man in charge of the service. This poses no threat to the chief resident insofar as patient management is concerned.

This type of clinical training must, however, be coupled with research training, either clinical or basic. In the latter area there is considerable room for improvement. It seems that everyone is interested in patient care; but research, while being recognized as an extremely important part of academic medicine, is very difficult these days. The young investigator knows he she has very little chance of getting research funding once training is completed. Herein lies one of the major problems in academic maternal-fetal medicine. The young investigator needs to be assured that there is a reasonable possibility of obtaining beginning research funds—a starter grant, if you will. Without some likelihood of this type of funding, rather than being an academic stimulant, as it is now, maternal-fetal medicine will become a crack toward the eventual splintering of obstetrics and gynecology.

The Relationship of Departments of Obstetrics to Other Medical School Administrative Units

Joseph Seitchik •

My assigned subject is the relationship of departments of obstetrics and gynecology to other clinical departments in medical schools. There are innumerable interfaces where physicians and medical scientists share professional and intellectual interests. The maturation of such disciplines as endocrinology, genetics, and reproductive and developmental biology has effectively perforated, even shredded, traditional departmental boundaries. Pediatric neonatologists and obstetrical specialists in maternal-fetal medicine have evolved a commonality that supersedes their traditional intradepartmental relationships. As new knowledge evolves and evokes new perceptions of reality, these current interprofessional, interdepartmental clinical and investigative associations will be altered, or perish, and new unimagined intercourse will be born. Chairmen who insist on restricting their academics to insular and isolated efforts will create departments of lily-painters and gold-gilders. If this unnatural selection should occur, departments will attract only the unimaginative and the unquestioning.

It is not my purpose here to identify current and potential clinical and investigative interfaces obstetrician-gynecologists have with other physicians or scientists within the medical school or university, but only to acknowledge the importance of these relationships. My specific concerns are twofold: to identify the limits

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to these academic efforts by obstetrician-gynecologists; and to suggest specific corrective measures to reduce such constraints.

My first postulate is that the faculties and administrations of medical schools hold departments of obstetrics and gynecology in lower esteem than other clinical departments with direct patient responsibility. If the coins of the academic realm are budgets, space, numbers of faculty members, and curriculum time—if these are the measures of worth—there is little question about the status of obstetrics and gynecology. The withholding of adequate support limits academic achievement, automatically providing a self-fulfilling rationalization for the decision makers to continue their practices.

Why does this condition exist? The power structures of medical schools are composed of highly intelligent professionals who, in the main, are most responsive to needs within the smaller community of the medical school and the larger society of patients, regions, and country. Yet the need for academic endeavor in obstetrics and gynecology continues to be derogated to a greater or lesser extent in all medical schools, even in schools in which these departments have achieved greater international recognition for their academic efforts than departments in other clinical disciplines. No matter what their successes, departments of obstetrics and gynecology continue to obtain less institutional support. Such irrational behavior by intelligent professionals and scientists cannot have its base in either logic or fact. If we are to understand this condition we must seek other origins for this judgment and behavior by our colleagues and administrators.

It is my second postulate that departments of obstetrics and gynecology are undervalued in respect to medicine, surgery, and pediatrics, and that this is neither by chance nor scholarly tradition, but is rooted in the clientele and the subject matter of our specialty. Women are our patients and human reproductive biology is our science. We care for a population of third-class citizens, and so we have acquired their third-ratedness by association. To insist that different diseases or classes of patients or basic science disciplines have identical value status within or outside medical schools is to abjure reality. If diseases and the physicians who treat

them have equal ratings on the social snobbery scale, contrast the surgical implantation of a pacemaker with a hemorrhoidectomy, or the treatment of lobar pneumonia with that of veneral disease.

If the social status of the patient is not reflected on the physician, why do we require the public reporting of physicians' incomes in excess of $100,000 if the funds are obtained from Medicaid, but not if from Medicare? Can it be that caring for welfare mothers is not as acceptable as caring for the aged? Who would deny that until recently the neurophysiologist or cell physiologist was esteemed more than the reproductive physiologist. Ernst Knobil was the first reproductive physiologist elected to the presidency of the American Physiological Society. Why did it take so long? Was there a dearth of candidates, or was the subject unworthy?

When the medical school at San Antonio opened in 1968 our basic science department chairmen, who had received their M.D. or Ph.D. degrees from Harvard, Hopkins, Stanford, Tufts, and Vanderbilt universities, had recruited thirty-four physicians and scientists to their departments for the initial academic year 1968–69. I could identify only a single individual of these thirty-four, however, with any scientific interest in reproduction. We had not recruited one pathologist in the fields of obstetrics, gynecology, or neonatal pathology, even though obstetrics, gynecology, and neonatology comprised the largest single inpatient service.

I do not bring this up to complain, for much has changed in the past eleven years because of the understanding of our former dean, F. Carter Pannill and the president of our health center, Frank Harrison, but merely to demonstrate the low esteem in which reproductive sciences and medicine is held by skilled and experienced scholars. Possibly this is so because each specific medical or biological discipline has its time of ascendancy, depending on developments in the physical sciences, or occasionally initiated by some serendipitous event in medical or biological research. But I cannot disjoin the recent logarithmic increase in interest in and federal support for reproductive science and medicine from the recognition of population size as an important problem requiring action.

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The gush of support for reproductive science was and is motivated by the desire for more effective methods of contraception and population control. If the effort were motivated by a desire to improve female reproductive health, why is research support limited to preimplantation phenomena? Why are federally supported patient services limited to contraception and not infertility? While I applaud the efforts of Congress to support research in reproduction, it is painful to admit that the motivation is economic and demographic. There is no evidence that the importance to female health * of the quality of generativity, if chosen, or the control of that choice has been a specific consideration in these federal efforts.

My third postulate is that ambivalent societal attitudes toward female sexuality reflect adversely on obstetrics and gynecology. If Shakespeare is an example of Elizabethan values, he speaks eloquently through King Lear:

> Behold yond simpering dame,
> Whose face between her forks presageth snow;
> That minces virtue, and does shake the head
> To hear of pleasure's name;
> The fitchew nor the soiled horse goes to 't
> With a more riotous appetite.
> Down from the waist they are Centaurs,
> Though women all above:
> But to the girdle do the gods inherit,
> Beneath is all the fiend's:
> There's hell, there's darkness, there is the sulphurous pit. . . .[1]

The female genitalia were mysterious and dangerous. But almost 400 years later the Victorians obliterated the very concept of female sexuality. P. Fussell, writing his opus on World War I, documents this point by quoting letters from single upper-class women to their beloveds in the trenches.[2] Words such as "intercourse" or "erection" were used free of any sexual connotation, because the ignorance of the writers excluded these sexual meanings. A generation of prose writers, particularly James Joyce and

* I use the term "female health" in the restricted sense of limitation to the prevention or treatment of the diseases or conditions that are peculiar to women.

D. H. Lawrence, exposed the reality of female sexuality to a literate public while the health professionals in medical schools were still rejecting Sigmund Freud and Robert L. Dickinson. And where are we today? The answer is contingent on the measuring scale we choose. If we select pre-, intra-, and intermarital sexual behavior, it would be justified to conclude that we are living in a sexually open society. But society is much more than the sum of these personal sexual freedoms. The attitudes of the institutions of society are very different; the result is the conflict of private behavior and public mores.

The controversy over the contraceptive pill is a perfect paradigm. The pill provided almost every adult woman the opportunity to choose to have sexual intercourse without fear of pregnancy. For the first time in history women are now equal in their sexual freedom. What has been the institutional response? Every real, suspected, imagined complication has been investigated by several governmental agencies and Congress and reported in the media over and over again. The ratio of the length of the required package insert for the pill Ovrette compared to that for digitalis, Crystodigin, is 19:1. Yet which pill causes more hospital admissions or is more lethal?

Consider the current Department of Health, Education, and Welfare (HEW) regulations on sterilization. Is the motivation to protect patients from precipitate decisions about their future childbearing while under the stress of labor and delivery? Or is this another attempt to dissuade multiparous women from taking convenient opportunities to control their own generative potential? Why does HEW feel the need to protect patients on welfare from those who perform elective sterilization, but not from any other form of elective surgery? It is difficult not to believe that these restrictive rationalizations are conscious manifestations of cruel fundamentalist resistance to female sexual freedom by some citizens of both sexes, or by repressed male sexual anxiety on the part of others. Departments of obstetrics and gynecology cannot escape these issues nor the associated depreciation and restraint of their patients and themselves.

My next postulate is that no one loves a pregnant woman,

including pregnant women. The source of this phenomenon is the psychological adaptive processes of pregnancy. G. Bibring identifies three phases: "the initial phase is essentially narcissistic concern over the physical transformations in her body and the minor symptomatology of early pregnancy. Although unsettling, it initiates the psychological adaptions to a new role and level of maturity: motherhood. The second phase occurs after quickening, and progressively associates the mother with the fetus as a growing part of her own body. The final phase of "letting go" occurs in the last weeks of pregnancy when the patient becomes emotionally adapted to having her fetal part progress to an independent extrauterine life. Note that in every phase the events are either emotionally unsettling, as in early pregnancy, or focused on the fetus, as in the latter half of pregnancy. This is no happy event for the mother's mind or body separate from her anticipated newborn. The woman's idealizations are with the baby and the family unit, not with her bloated and ungainly self. Most of Bibring's patients were not pregnant by choice, although many did adapt successfully during pregnancy. How this lack of control and the ensuing rage against female vulnerability may have influenced her analyses is unknown.

In contrast, the poet and novelist Erica Jong recalls her elected pregnancy experience as an entirely joyous event:

> I had dreaded my pregnancy as a loss of control over my destiny, my body and my life. I had fantasies of death in childbirth, the death of my creativity during pregnancy, the alteration of my body into something monstrous, the loss of my intelligence through mysterious hormonal sabotage, the loss of my looks, my energy, my robustness.
>
> But I ought to have known that the ruler of the cosmos is nothing if not a Joker—and all the opposite things happened. For the first time in my life, I controlled my weight effortlessly; my face grew thinner, my skin clearer, my eyes brighter. I never felt sick or lacked energy. I worked as hard at my writing as I ever had in my life—and, in fact, worked with greater consistency. I wrote a number of poems, continued to toil productively at the novel I had begun a year before becoming pregnant, and even undertook a grueling book tour for my second novel when I was in my fifth and sixth months of pregnancy.[3]

It is true that retrospective views of the pregnancy experience,

like adolescence, are characterized by much protective forgetting. But it is possible that a successful mature woman who chooses pregnancy may have an emotional experience different in its conscious manifestations than those studied in the past: "Mute, enraged, trapped first by their own bodies, then by society, they could feel only fury at that helplessness and loss of control—however much they may have loved the infants they produced." [5]

The sum of these normal psychological adaptations of pregnancy, our all-too-recent history of imposed pregnancy without choice, and obstetrical services that reduce the role of maternity patients in their own care all function to diminish independence and perceptions of self-worth.

It is my belief that this "helplessness and loss of control" is the root of the antiobstetrician movement today as it was 200 years ago. When Mary Wollstonecraft, the eighteenth-century English feminist, was pregnant with the child who years later was to write the novel *Frankenstein* she rejected medical care as a feminist statement of independence.[6] She paid for this act of heroism by dying of postpartum hemorrhage and puerperal sepsis. Two hundred years later, we witness the evolution again of home delivery and lay midwifery, and birthing centers with variable qualities of personnel and facilities. This is no more than the return of the "Mary Wollstonecraft syndrome." In addition to the cost of this movement to the health of mothers and fetuses and newborns, there is the challenge to obstetrics as a legitimate, professional source of health maintenance and disease control in pregnant women. The logical translation of these movements into health planning action suggests there is a very limited role for physicians in the birth process, and little reason for support of obstetrics in medical schools.

Running parallel to this movement is another unorganized sect consisting of some lawyers, psychologists, and pediatricians. This group worships children; women are tolerated only for their procreative functions. If they were organized and had a constitution, the preamble would read:

> All children are created equally smart and any child who develops fewer smarts than his brother or sisters is the result of efforts by obstetricians

to either relieve the pain of childbirth or failure to perfom a cesarean section.

Over a year ago I read in the Sunday *New York Times* that the National Institute of Neurological and Communicative Disorders and Stroke had issued a report by Sarah Broman and Yvonne Brackbill, who concluded that the use of pain-relieving drugs in patients in labor had resulted in diminished intelligence and increased frequency of reading disorders in the children. This worrisome report could not be ignored, so in February 1979 I asked my secretary to track down its origin and obtain a copy of the document for my own review. What I received contained no data; it consisted of conclusions presented in testimony before the Senate Subcommittee on Health and Scientific Research dated 17 April 1978.[7]

All professionals with experience in labor and delivery know that normal labors are variable in respect to duration, pain, and ease of expulsion of the fetus, regardless of the mother's preparation for chiklbirth. Individual needs differ. The origins of intelligence or learning imperfections in our children are too numerous to recount here. But to isolate a single factor, obstetrical analgesia or anesthesia, as a solitary significant factor, to publicize such conclusions, and to fail to provide the medical community with the opportunity for peer review of the study, provides a second generation of "dirty tricks." To raise the specter of fetal and neonatal injury, and induce the invariable maternal guilt associated with defects or deficiencies of any kind in children on the basis of our contemporary knowledge of indicated maternal pain relief, is to revive the theological pre-Victorian arguments on the morality of pain relief in labor and delivery.

At the same time, the drive by government and professionals for improved perinatal outcome has resulted in a progressive increase in the use of cesarean section. Where is the cry now from HEW? What is the legitimacy of performing cesarean sections for the delivery of an 800 g. breech fetus when the patient has ruptured membranes or uncontrollable premature labor? Perhaps the neonatal outcome is slightly better than after vaginal delivery, but is it sufficient to warrant all this maternal trauma? In most hos-

pitals one cesarean section means that all subsequent deliveries will be by cesarean section. So it is not only one cesarean section that may result.

How much maternal trauma and pain is legitimate to prevent what quantity and quality of fetal injury? I do not have the answer, but then I have not even heard this question asked. Why? Because children have a higher social status than their mothers. If you disagree with my thesis, then explain why almost every chronic and some acute conditions of infants and children have special foundations to provide funds for research and care; I cannot identify a single foundation whose activities are solely directed to any aspect of female health. We find a major interest and investment in the sudden infant death syndrome, which occurs at a frequency of about 2-3 per 1,000 live births,[8] but no investment in the sudden fetal death syndrome that occurs at a rate of 1.5-2 per 1,000 births in low-risk mothers between the twentieth week of pregnancy and the onset of labor.[9]

In summary, it is my thesis that departments of obstetrics and gynecology and reproductive and developmental biology are inadequately supported and encouraged in medical schools. This condition devolves in part from the tertiary (after men and children) value status of women. Less apparent, but as significant in this derogation, is the reluctance of male-dominated institutions in our society to accept the modern reality of female sexual freedom.

SOLUTIONS

What can be done? I have five suggestions, four positive and one negative:

• We should continue to teach, to practice, and to do research in our discipline. Recognizing our roots in reproductive and developmental biology, we should insist that each department of obstetrics and gynecology in each medical school be provided the basic necessities for this endeavor. We should demand that the basic science departments have an adequate cadre of scientists, sufficient to introduce students to the science of reproduction in all its manifestations. This core should be willing to interface with each other and the clinical faculty for teaching and research. If the

value systems of the chairmen of the basic science departments have resulted in inadequate recruitment, then the administration of the university should provide the necessary faculty and space for that effort within the department of obstetrics and gynecology. We should also continue our clinical investigations. Clinical facts of certainty are hard to obtain. For example, is the rising frequency of maternal trauma in the form of cesarean section providing an equivalent yield in neonatal health? If so, at what point does this yield reach an asymptote? These activities have always been our business, and we should keep at it.

• We should eschew the present clamor to train generalists. If society desires family doctors, let us help train them. If internists and pediatricans are concerned with their identification as generalists, let us help train them. We should continue to train our young to become physicians to women for all those conditions that are special to women in all their dimensions, from cancer to psychosexual disorders. And we should do this because we know that women need such physicians, and that their diseases provide unsolved problems that require research. We should train some of our young for this latter activity.

• While we obstetrician-gynecologists are politically powerless to effect change, we can remain sensitive to the manifestations of responses of women to their conditions in respect to health care. The alternative health care movements are variants of the "Mary Wollstonecratt syndrome": rejection of traditional modes of health care as a feminist statement. They are also environments in which women may achieve policy and decision-making positions.[19] Where these exist approximate to medical schools the faculty should not discourage participation, but rather use their knowledge and skills to enhance the quality of care. A second example is family-centered labor and delivery. The prospect of diapered children racing around the birthing room while we try to resuscitate a neonate who has aspirated meconium is not in harmony with my equanimity. But if this is what our patients want, I believe we should cooperate unless we have specific cogent reasons to reject these innovations. If family-centered obstetrics means parents who are properly educated to their tasks for labor, delivery, and care of the

neonate, our discomfitures in adapting are small in terms of the potential gains. But while we should not reject these movements out of hand, it is also our responsibility to evaluate their effectiveness. Acceptance of a patient's desires does not require rejection of our ability for critical analysis.

• My fourth suggestion relates to our roles as leaders in obstetrics and gynecology. As the number of women in medical school classes increases, the number of women in obstetrical and gynecological residencies grows. This provides us with much opportunity. Many of our female residents are seeking practice careers because they believe they can provide care to their sisters in a singularly sensitive manner. Their second motivation is escape from a male-dominated medical center. If we wish to alter the position of departments of obstetrics and gynecology in the medical schools, it is imperative that female students and residents be assured of a place in the patronage system.[1] The token "lady doctor" in the department as a role model is an ineffective device. What is required is active encouragement of our female physicians, by assuring that they can enter the system of professional patronage and sponsorship that all of us know is one of the essential requirements for achieving positions of responsibility and authority. Such a commitment by us would have a different effect than if attempted by other specialties, because only we train physicians to care for women and to do research on problems and diseases peculiar to women's health. I am not suggesting that departments of obstetrics and gynecology be limited to women; only that women be educated, trained, emboldened, and sponsored so that positions of policy and decision making will have no gender orientation.

• Finally, I would insist that in all administrative sets we disassociate the health care of women from demography, pediatrics, or any other discipline. From the creation of the maternal and infant care programs of the 1930s, and the NICHD in the 1960s, to the family planning services and research programs of the 1970s, the rationale has been the solution of a perceived public problem, not the health care of women. The common wisdom was that services and research in women's diseases would improve the

health of newborns and children; contraception would control population size—never the simple logic that women have specific health problems, and that they and their problems are worthy of attention in the form of services and research by public and private agencies. I am not suggesting intellectual isolation, but I insist that women will not receive their fair share of the dollars available for health services and research until appropriate administrative and institutional structures are developed. A national institute of women's health would be an effective start both as mechanism and symbol.

NOTES

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3. G. Bibring, "Some Considerations of the Psychological Processes in Pregnancy," *Psychoanalytic Study of the Child* 14 (1959): 113-21.

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6. E. H. Kaiser, "The Obstetric Death of Mary Wollstonecraft," *American Journal of Obstetrics and Gynecology* 125 (1976): 1.

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Obstetrics and Pediatrics: Their Relationship in a Changing World

Elizabeth R. McAnarney

> *For each age is a dream that is dying*
> *Or one that is coming to birth*[1]
>
> A. W. E. O'Shaughnessy (1844–81)

I shall be addressing the relationship of pediatrics to obstetrics-gynecology from my experience as an academic pediatrician who has planned and administered services for adolescents for nearly a decade. We have developed an adolescent maternity project in the Division of Adolescent Medicine in Pediatrics at the University of Rochester School of Medicine, and we therefore work closely with the Department of Obstetrics-Gynecology.

I shall confine my remarks to issues about "Who should do what?" in programs of joint interest to pediatrics and obstetrics-gynecology in an academic medical center, and not to a description of what the departmental administrative structures should be now or in the future.

First, in order to appreciate where they are today, let us consider the history of pediatrics and obstetrics-gynecology and their transition into separate academic disciplines.

As a specialty of medicine, pediatrics had no real identity before the middle of the nineteenth century. Its early history was only a small part of internal medicine. As far back as Hippocrates (460-370 B.C.) references were made to the special features of children's diseases. The close relationship of pediatrics and obstetrics-gynecology was reflected in the gynecological treatise of Soranus of Ephesus in the second century, which provided a com-

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plete account of pediatrics in antiquity and covered topics such as the birth, washing, swathing, nutrition, and teething of the infant.

It was not until 1769 that organized services for children were developed in England by George Armstrong, who founded the first pediatric hospital, the Dispensary for Poor Children, which remained open for twelve years and admitted 35,000 children.

Abraham Jacobi "pressed the button which set the pediatric clinic in motion" in the United States. In 1860 he was appointed to the first special chair of diseases of children at New York Medical College. Together with Emil Noeggerath, Jacobi founded and edited the *American Journal of Obstetrics and the Diseases of Women and Children*. He was the first president of the American Pediatric Society, and taught pediatrics in New York City from 1857 to 1899. Parenthetically, he also was the first to employ bedside instruction in this country.

In the twentieth century pediatrics moved further toward its separate identity into the larger sphere of social medicine, with particular focus on the nutritional and metabolic problems of children, infant welfare and mortality, an understanding of infectious diseases, the prevention of disease, and the importance of immunizations.[2] As the morbidity and mortality from the early dilemmas of infectious diseases and nutritional problems have been overcome, pediatrics recently has been considering a redefinition of the specialty.

In 1978 the Task Force on Pediatric Education urged training programs to concentrate on biosocial and developmental problems of children and adolescents, adolescent medicine, the care of chronically ill children and adolescents, and primary care pediatrics. As part of adolescent medicine, adolescent gynecology has been singled out as an emerging area of importance for pediatrics.[3]

Obstetrics as a specialty of medicine has its historical roots in nurse midwifery. Nurse midwives originally had no formal clinical instruction in obstetrics and eventually were replaced by scientifically trained physicians. There were midwives in early America, but, with the exception of the colony of New York, they were neither trained nor licensed. The prevailing theme of the

early nineteenth century, which reflected the educational tone of the emerging specialty of obstetrics, as well as the relationship between the sexes, was:

> There is no such thing as being a good practitioner of midwifery without understanding anatomy: now this science is the province of a man, of a physician, or surgeon, not of a woman.[4]

In 1767 King's College Medical School in New York established a separate chair in midwifery. The first obstetrical clinic was opened in 1770 at the Almshouse in Philadelphia; and in 1813 midwifery arrived as a specialty when a course in obstetrics was required for all medical students. The intimate relationship between pediatrics and obstetrics was reflected by the fact that in 1845 Gunning S. Bedford held the chair in midwifery and the diseases of women and children at the University of New York.[5]

The specialty of gynecology derived from general surgery. General surgeons often opposed the efforts of obstetricians and gynecologists to develop their own specialty. The American College of Obstetrics and Gynecology was founded in 1930 by three fellows, one each from the American Gynecological Society; the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons; and the Section on Obstetrics, Gynecology, and Abdominal Surgery of the American Medical Association.[6]

Thus, even though pediatrics and obstetrics and gynecology developed from three separate specialties—internal medicine, midwifery, and surgery, respectively—they shared much in common from the historical perspective. Today they still share much in common, but must continually work together to clarify their exact roles and relationship in a changing world.

The remainder of this discussion will focus on three areas of emerging importance to pediatrics and to obstetrics-gynecology. The exact definitions of these areas will depend on mutual exchange and communication between both specialties to provide ultimate excellence in research, teaching, and patient care. The three areas are:

- Adolescent gynecology
- Perinatology
- Primary care

I will use the program in adolescent gynecology in our institution as a model for the development of other programs of shared and mutual interest to pediatrics and obstetrics-gynecology.

To separate adolescent gynecology from the overall practice of gynecology appears to some people to be artificial and hair-splitting. To others, the special needs of adolescents, the effects of their developmental stage on their participation and compliance in health care, and the effects on their health of the ever-changing social and moral culture in which they live warrant consideration. This consideration of adolescent gynecology has been accelerated by developments in society over the last several decades, including the growing number of adolescents, the decreasing age of biological maturity of both females and males, the increase in sexual activity among adolescents of all ages, and the generalized availability and accessibility of contraceptive devices.

In the United States approximately 900,000 adolescents become pregnant annually; of these, approximately 330,000 have abortions, and 570,000 have babies. The rates of births among adolescents have decreased in all age groups, except for young people age ten to fourteen, who are psychologically immature. The rate of gonorrhea among adolescents age fifteen to nineteen is 1,212.4 per 1,000, second only to that of adults twenty-five to twenty-nine years of age.

These figures fail to present the entire picture of the morbidity of adolescent sexuality: the loss of formal educational and vocational opportunities because of pregnancies; concerns about the development of the adolescent's child, and whether its potential will be reached if she/he is cared for by another "child"—the adolescent mother; repeated pregnancies during adolescence; and sterility as a result of untreated gonorrhea.

Who is in the stronger position to provide care to the pregnant and/or sexually active adolescent—the pediatrician or the obstetrician-gynecologist? A pregnant woman becomes the patient of the obstetrician-gynecologist; the adolescent sees the pediatrician. There is little doubt in our thinking that the obstetrician-gynecologist should be responsible for the obstetrical care of the young mother, even though pediatric fellows in some medical

centers are being encouraged to learn obstetrical care of adolescents. Her psychosocial care—including counseling about the disposition of her pregnancy, instructing her in anatomy and physiology and the details of delivery, as well as her postpartum education and plans for the care of her child—could be provided by either the obstetrician-gynecologist or the pediatrician, as long as they understand adolescent development. The pediatrician should be responsible, as would be expected, for the infant's neonatal and pediatric care.

The exact roles of the obstetrician-gynecologist and pediatrician become less clear in the care of the postpartum, sexually active adolescent who seeks contraception. Few would argue that the postpartum patient should visit the obstetrician-gynecologist at least once, to ensure that there are no obstetrical complications. After that initial visit, who should provide the adolescent with contraceptive care, including instruction about and the provision of contraceptives?

The pediatrician usually has training in and knowledge of adolescent growth and development as one stage in the overall development of children. The pediatrician also is often the adolescent's primary care physician, and thus can provide care for the sexually active adolescent within the general health care context, rather than separating sexuality from overall health concerns. Many pediatricians have not been formally trained in gynecology, however, and do not have a thorough knowledge of contraceptives and their side effects. They may practice gynecology in a superficial manner, without recognizing the limits of their practice. For example, some pediatricans may be able to insert intrauterine devices, but are they equipped to handle the complication of a perforated uterus? A pediatrician who has formal training in gynecology and who knows the limits of her/his gynecological training may be in a strong position to provide care for sexually active adolescents.

The obstetrician-gynecologist has a greater and deeper knowledge of the specialty; longer training and experience in the use of contraception, as she/he also treats adults; a more intimate understanding of contraception methods; and the surgical skill to care

for the infrequent complication of a perforated uterus. Some obstetrician-gynecologists have not, however, been trained to understand adolescent development and the strong effect of the adolescents' cognitive and educational backgrounds on their compliance with health care instruction. For example, most twelve-year-olds have not reached the level of formal operational thinking to plan ahead, and thus cannot use diaphragms effectively because this method necessitates preplanning. One could argue that an obstetrician-gynecologist trained in adolescent growth and development might be the ideal person to treat sexually active adolescents.

Most pediatricians and obstetrician-gynecologists agree that either specialist who is familiar with treatment regimens can treat uncomplicated gonococcal cervicitis, urethritis, pharyngitis, or proctitis. But who should provide care to the adolescent who has pelvic inflammatory disease (PID)—the pediatrician and/or the obstetrican-gynecologist? Debate continues over this issue in our setting and it needs clarification. Some adolescents are treated in our adolescent inpatient unit by pediatricans in consultation with obstetrician-gynecologists; others receive care on the obstetrical-gynecological floor. At present we do not have a clearly stated policy.

In an attempt to communicate about this new frontier of adolescent gynecology we have instituted in our medical center several mutual activities between pediatrics and obstetrics-gynecology:

- A jointly administered adolescent maternity project in which patient care is shared by pediatricians and obstetrician-gynecologists.
- Rotation of pediatric and obstetrical-gynecological house officers through the maternity project, with residents in the latter specialty assuming obstetrical care for the patients and, at the same time, learning about adolescent development, and pediatric residents seeing the pregnant mother in her last trimester, providing pediatric care for the infant, and thus learning about the adolescent as a mother.

- Formal training of pediatric residents in adolescent gynecology.
- Regular teaching sessions on adolescence for obstetrical-gynecological house officers by pediatric faculty.
- Joint research on the risks of adolescent pregnancy by faculty from pediatrics and obstetrics-gynecology.
- Joint planning and development of a postresidency fellowship training program in adolescent gynecology for pediatricians, obstetrician-gynecologists, and nurse clinicians.

This model we have developed for adolescent gynecology could be applied to other areas of emerging importance shared by pediatrics and obstetrics-gynecology: perinatology and primary care, for example. Clarification of roles may evolve by working together on issues of mutual concern.

Perinatology has a natural event, birth, that facilitates clarification of professional roles: prior to birth the obstetrician-gynecologist, as a specialist in fetal medicine, provides specialized research, teaching, and patient care, while the pediatrician, through the increasingly complex science of neonatology, provides specialized research, teaching, and patient care for the neonate. Some think that obstetrician-gynecologists and neonatologists share more in common than neonatologists and pediatricians—a provocative question of roles that will need clarification in the future; others believe this is not a feasible alternative.[7] As an interim measure, neonatologists and perinatal obstetricians might have appointments in both pediatrics and obstetrics-gynecology. Some institutions are employing this plan actively.

The pediatrician has little trouble in recognizing general pediatrics as a primary care specialty; obstetrics-gynecology is also a primary care specialty.[8] Both pediatricians and obstetrician-gynecologists share the dilemma of providing a narrower scope of primary care than do internists or family physicians. Internists provide care for male and female adolescents and adults; family physicians provide care for both sexes of all ages. The exact role of the obstetrician-gynecologist in primary care warrants greater clarification.

The relationship of pediatrics to obstetrics-gynecology in this changing world remains to be defined. There are several areas of joint concern for which the combined skills of both disciplines are needed to develop better research, teaching, and patient care for health problems of increasing sophistication. The challenge is ours jointly to grasp.

NOTES

1. A. W. E. O'Shaughnessy, *Ode*, stanza 3.

2. F. H. Garrison, "History of Pediatrics," in I. A. Abt, *Abt-Garrison History of Pediatrics* (Philadelphia: W. B. Saunders, 1965): ch. 1.

3. *The Future of Pediatric Education* (Evanston, Illinois: Task Force on Pediatric Education, 1978).

4. C. Fox, *Pregnancy, Childbirth, and Early Infancy in Anglo-American Culture*, (Ann Arbor, Michigan: University Microfilms, No. 67-7838, 1967).

5. J. B. Donegan, *Midwifery in America, 1760–1860: A Study in Medicine and Morality* (Ann Arbor, Michigan: University Microfilms, No. 72-20325, 1972).

6. R. A. Leonardo, *History of Gynecology* (New York: Froben Press, 1944).

7. L. Gluck, "Thoughts on the Future Structure of Perinatal Medicine," *Journal of Perinatal Medicine* 2 (1974): 230-32.

8. Letters: "Primary Care for Women," *Journal of the American Medical Association* 233 (1975): 1163-64.

ACADEMIC OBSTETRICS:

What Are The Needs?

Luigi Mastroianni, Jr.

Departments of obstetrics and gynecology in large medical centers have undergone great changes in the past two decades. Previously, obstetrician-gynecologists were, by and large, genuinely admired for their technical skills, but often looked down upon in academic circles because the discipline appeared not to present intellectual challenge, or even the opportunity to advance a somewhat static and standard area of practice. This concept of the specialty was supported by a lock-step system of residency training that emphasized technical skills and clinical judgment almost exclusively. In contrast to colleagues in medicine and pediatrics, the academic obstetrician was not expected to have developed expertise in any of the research disciplines related to the specialty. Those who recognized the importance of laboratory programs to test hypotheses and ferret out the mysteries of uterine function, placental blood flow, fertilization and early development, or endocrine action were the exceptions.

More recently, progress in those areas that fall within the purview of the obstetrician-gynecologist has been rapid. Research previously neglected and not regarded as the standard fare of the obstetrician-gynecologist has been incorporated with the activities of academic departments. The discipline is witnessing a gradually changing image, and the modern department of obstetrics and gynecology is taking on a new, broader role in biomedical research and education.

At the clinical level the obstetrician-gynecologist is still the purveyor of health care for women. This role has been expanded, however, and pregnancy-related conditions and the overall function of the female reproductive tract are receiving more comprehensive attention. Exciting new avenues of research have been opened, and increasing numbers of medical students and residents now find the discipline stimulating and a veritable goldmine for productive thought and research. The field is uniquely geared to a multidisciplinary approach, especially in the area of classical research disciplines. The talents of the nonclinician are being increasingly utilized, with emphasis on a team approach. This trend is having a positive effect on both academic obstetrician-gynecologists and the investigators with various backgrounds in the basic sciences who are working within the framework of today's academic department.

A variety of research areas are represented within obstetrics and gynecology. The two principal areas, perhaps those with the greatest visibility at present, are endocrinology and reproductive biology. These fields encompass a number of basic science disciplines, including anatomy, physiology, biophysics and biochemistry, microbiology, pharmacology, and genetics, all of which are increasingly difficult to define as single entities, but which usually enjoy departmental status. In each a viable subspecialty is created by simply adding the adjective "reproductive."

Investigators in nonbiomedical areas are also finding challenging research opportunities in obstetrics and gynecology. With growing recognition of the wide-ranging effects of behavior and social structure on procreation and childbearing, the social and behavioral sciences have come into play. The discipline also offers opportunities for investigators in biostatistics and epidemiology; each of these disciplines brings to obstetrics and gynecology a much broader definition of its role in academia.

The introduction to the field of reproduction of academicians representing other standard disciplines was spearheaded largely by forces outside the medical school. The present structure of most schools does not offer the flexibility to foster such a development de novo. The need for the academic development of ob-

stetrics and gynecology was recognized early by the Macy Foundation. The programs of the Population Council, and the Ford, Rockefeller, and Mellon foundations, with their interest in contraceptive development and emphasis on reproductive research, also encouraged a broadening of the field, as has the National Foundation, which is focusing on birth defects. This support has allowed the incorporation of other disciplines with obstetrics and gynecology and helped to create a much-needed interface.

The expanding programs of the National Institute of Child Health and Human Development provided a broad base of research support without which the field would have remained relatively static. Extramural monies provided opportunities for the development of facilities for reproductive research, for the support of training and research time for clinicians, and for the development of basic scientists with primary appointments in departments of obstetrics and gynecology.

Departments of obstetrics and gynecology have become more and more dependent on resources outside the institution to maintain established programs. The willingness and, in fact, financial capacity of medical schools to maintain a cadre of basic scientists within a department traditionally looked upon as a purely clinical one is open to question. One of the principal needs in academic obstetrics and gynecology, therefore, is the continued interest of the private sector in interdisciplinary efforts within the discipline.

Availability of resources to support programs in reproduction that include the nonclinician, although essential, is not sufficient in itself to foster continued academic development. Institutions must identify ways to provide an attractive academic berth for the nonclinician in obstetrics and gynecology—one in which she/he will feel comfortable, separated geographically or by academic title.

Some institutions have elected to change the name of the department or to add an additional label that signifies a broadened base of activities within obstetrics and gynecology: reproductive biology, or gynecology, obstetrics, and reproductive sciences, for example. It is equally possible to maintain relationships by altering the priorities within the department itself. Be that as it may,

no change in name or in emphasis can be effective unless the institution is convinced that primary appointments of nonobstetricians in the department should carry with them equal academic status. Investigators from other fields can readily maintain associations that attest to their roots through joint appointments. If such appointments can be made in tenure tracts, which is difficult in private schools, they permit the recruitment of the best possible persons. The issue revolves around the commitment of the institution to expanded academic programs within obstetrics and gynecology, and this involves a process of education and reorientation.

Another avenue by which the status of obstetrics and gynecology is enhanced is the establishment of problem-oriented groups within medical centers. Particularly noteworthy has been the emergence of perinatal centers in which the pediatrician and obstetrician-gynecologist work within a single administrative structure separate from the department. An equally effective arrangement is to develop a functional interface between two or more clinical departments, which together establish a liaison with the basic scientist. Other examples of interdepartmental effort that should be encouraged include female reproduction and andrology (urology), gynecological oncology, and radiotherapy or medical oncology. Such relationships are best promoted through a common interest in a given research or clinical problem; with proper leadership and support they can be meaningful and academically productive.

As new research-oriented programs have been evolving, it has become increasingly evident that the pool of clinician-investigators with research training, as well as credentials in obstetrics and gynecology, is small. This highlights the need for the further development of training programs for academically oriented obstetrician-gynecologists. Given the complexities of modern science, those who have devoted years to perfecting clinical skills cannot hope to maintain equivalent skills in a basic science discipline on a part-time basis. To remain competitive over a long interval the part-time clinical investigator must have substantial interplay with full-time researchers. Nevertheless, clinicians

should be afforded opportunities for additional training in a basic science discipline for a minimum of two to three years; the clinician-investigator should therefore be encouraged to set aside time to permit continued research contributions. The financial implications of such arrangements are obvious. Institutional support of this sort of time commitment, a sine qua non for other clinical disciplines such as medicine and pediatrics, is not generally available for obstetrics and gynecology.

Consideration should be given to the development of additional areas that are important to reproductive research. One area worthy of increased attention is epidemiology and statistics. At present, obstetrics and gynecology is dependent on the services of statisticians and epidemiologists to design and conduct studies of critical importance to the field. Unfortunately, the statistician-epidemiologist, although well grounded in her/his particular discipline, often does not have the perspective or the appreciation of some of the unique problems in clinical obstetrics and gynecology. The impact of contraceptive measures on future fertility, for example, has yet to be adequately explored, and their risk factors have been poorly defined. Obstetrician-gynecologists trained in statistics and epidemiology could bring a perspective to such problems.

Nor have the behavioral sciences been sufficiently incorporated into the efforts of departments of obstetrics and gynecology. Behavioral aspects generally have been neglected in clinical and research approaches to both family planning and infertility. More interdisciplinary effort is needed. This can be brought about through the creation of positions in departments of obstetrics and gynecology for individuals with backgrounds in psychiatry and psychology, and through encouraging obstetrician-gynecologists, perhaps through categorical funding, to seek additional training in the behavioral sciences. At the University of Pennsylvania, for example, such interdisciplinary cooperation has been brought closer to reality by the establishment of a professorship in the Department of Obstetrics and Gynecology—the Stuart and Emily B. H. Mudd Professorship of Human Behavior and Reproduction. Similar innovations should be encouraged elsewhere.

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A final issue, and the most pressing one, centers on the present climate of support for obstetrics and gynecology, as well as for medical education in general. Since many of the programs in departments of obstetrics and gynecology are of recent vintage they are particularly vulnerable in times of fiscal constraint. In the 1965–66 academic year federal support constituted 55 percent of the total revenues of medical schools;[1] ten years later this had declined to 37 percent, and governmental capitation grants now amount to only 3 percent of total revenues. Concomitantly, state support has increased from 16 percent to 27 percent of total budgets, but such funding is confined largely to state-supported schools. The "private" institutions have absorbed the major impact of the decrease in governmental support, and this is having its greatest effect on clinically oriented departments such as obstetrics and gynecology.

As a result of serious accumulated debts because of higher tuitions, students are constrained to pursue a clinical career in order to generate the wherewithal to satisfy their obligations. Because of a wider gulf between incomes derived from academic positions and those generated from private practice, academic obstetrics and gynecology will suffer more from this mounting student debt load than will some of the other specialties.

Academic obstetrician-gynecologists are being called upon to care for larger numbers of patients: in inner-city medical centers virtually all Medicaid recipients come under their care. The recent introduction of legislation requiring identifiable and personal care for Medicaid and Medicare recipients has dramatically expanded the practice time commitment required. Hospitals are collecting nearly full cost for their Medicaid services; in contrast, the faculty is asked to subsidize the care of the poor by accepting minimal Medicaid compensation. For example, in 1979 Pennsylvania Medicaid allowed only $100 for delivery and inhospital obstetrical care. There is a need to reexplore systems for the provision of obstetrical care within academic institutions, and to provide appropriate financial remuneration for the efforts of faculty in the supervision of such care.

As issues surrounding the overall support of medical schools

are being grappled with in the United States, systems must be identified that will provide additional sources of support for time spent in creative investigative work. Programs designed to allow the clinician-investigator in obstetrics and gynecology to devote substantial portions of time to research must be established. An especially good case can be made for biomedical research in obstetrics and gynecology. Knowledge derived therefrom will clearly have a direct impact on our ability to treat reproductive disorders, and the importance of this to society is recognized by all but the unthinking.

NOTES

1. D. R. Perry and D. R. Challoner, "A Rationale for Continued Federal Support of Medical Education," *New England Journal of Medicine* 300 (1979): 66.

How Do We Meet The Needs?

William G. Anlyan

For thirty-one years—since my fourth-year medical student rotation—I have been an interested obstetrics-gynecology watcher. At that time, sixteen deliveries and one cesarean section in which I participated convinced me that my future should be in a different field.

Most participants in this conference represent the current generation of leadership in obstetrics and gynecology. With the help of private foundations, the National Institute of Child Health and Human Development (NICHD), and other components of the National Institutes of Health (NIH), you have brought academic obstetrics and gynecology to *near* parity with other academic clinical departments. Even so, there is much to be done to equal other academic disciplines in the 1980s and 1990s. What steps should be taken to correct the discrepancies so that the

products of academic obstetrics and gynecology departments can serve the best interests of society?

First let us look at where obstetrics and gynecology stands in the academic milieu. In most universities there are five clusters of faculties in medicine:

Cluster 1. Basic scientists who interface in education and research with the faculties in the physical, social, and engineering sciences.

Cluster 2. Traditional basic scientists who may teach collegiate-level students as well as medical students and Ph.D. candidates.

Cluster 3. Clinical investigators who have both an M.D. and a Ph.D., or the equivalent education and research training experience. Often these faculty members hold joint appointments in a clinical and a basic science department, are usually full-time, and are supported by a combination of departmental and grant funds. They are responsible for the transition of basic laboratory research to clinical investigation. They represent continuing educational resources for the traditional academic clinicians. Their clinical practice may be limited to two or three half-days a week.

Cluster 4. Traditional clinical faculty handling complex tertiary care patients, in large measure on a referral basis from physicians in regional communities. Some members of this cluster may be on a geographic full-time basis, and are usually self-supporting from fee-for-service group practice arrangements.

Cluster 5. Clinicians who bridge the gap between the university teaching hospital and the affiliated community hospitals. Patient care and education may be effected in more than one hospital. Their outreach activities carry new knowledge and technology to the community setting.

Now let us examine the economic profile of the various clinical departments in the academic medical center.

I. THE SELF-SUFFICIENT

Surgery and its subspecialties, anesthesiology, and ophthalmology are in this fortunate group. As long as the fee-for-service

mechanism prevails, these specialists can manage most of their affairs with minimal subsidy from the institution, and, in fact, contribute to the overall institutional capital improvements and/or operating budget. They recognize the interdependence of all departments, both clinical and basic science. They have the capability to build up modest monetary reserves to help pump prime new faculty appointees, new research programs, and new departmental facilities.

II. THE MARGINALLY SELF-SUFFICIENT

Practitioners of internal medicine and its subspecialties, radiology, and psychiatry are in this category. They can achieve most of the objectives of Group I, but may have to be more limited in choices. If psychiatry embodies a basic behavioral science component, survival becomes more difficult. Endowment funds can help to increase their "buying power" and "venture capital."

III. THE DEPENDENT

Community and family medicine, obstetrics and gynecology, and pediatrics are in this group. In a variety of institutions the degree of dependence of community and family medicine differs depending on grantsmanship and involvement in clinical practice beyond the central "model" family practice clinic. The good news for academic obstetrics and gynecology is that academic pediatrics is worse off. Were it not for the gynecology division generating surgical fees, they would parallel each other's financial woes. Focusing hereafter on obstetrics and gynecology and pediatrics, it has been my experience that these two departments cannot generate fee-for-service monies to develop financial reserves to pump prime new faculty, new programs, and additional physical facilities. They require institutional support that approaches the level of basic science departments. External funding from foundations and state and federal agencies *is crucial*.

In surgery and medicine, faculties in Cluster 4 can develop the necessary reserves to pump prime support and provide tenure

backup for clinical investigators in Cluster 3; this is not so with obstetrics and gynecology and pediatrics. Some may raise the question of additional institutional funding to help these latter two departments. The outlook for institutions, however, particularly private ones, makes it unlikely that their central coffers will be bulging in the 1980s because of their need to fund the basic sciences; keep up with inflation; face the loss of federal capitation monies; cope with the decreasing purchasing power of NIH funding; adjust to lower overhead recovery of research (Circular A21); and comply with Sections 223 and 227 of Medicare, as well as with ever-increasing federal regulations.

The problems of obstetrics and gynecology and pediatrics are aggravated further by the fact that they have no potential for participation in an affiliated Veterans Administration hospital, and a high proportion of their clinical faculty members who are using inpatient beds may be "part time" or "clinical," with little or no allegiance to the academic activities of the departments.

RESEARCH PROGRAMS OF CLINICAL DEPARTMENTS

Earlier in this conference one distinguished speaker espoused an elective rotation of a few months in research during residency training. My views are exactly opposite—a "touch" of research at that late stage is useless and wasteful.

In *Twelfth Night*, Malvolio reads a letter from Lady Olivia (actually written by her maid Maria) which says, in part: "Some are born great, some achieve greatness, and some have greatness thrust upon them." In research, a paraphrased modification might read: "The best researchers are born great and exceedingly bright, a few may achieve the stature of noted researchers, but pitifully few can have research thrust upon them and succeed."

The same sentiment prevails for a clinical department "buying a Ph.D." to develop and do research. Any individual with a Ph.D. coming into a clinical department should be recruited jointly with the appropriate basic science department, and be equally respected in teaching and research.

WHERE, WHEN AND HOW, IN THE CONTINUUM OF MEDICAL EDUCATION, TO IDENTIFY THE FUTURE ACADEMIC OBSTETRICIAN-GYNECOLOGIST

An occasional high school student may emerge who does creative work, part-time or during the summer, in an established biomedical laboratory. They should be nurtured and their future careers monitored.

At the collegiate level one is more likely to identify the genius or brilliance of a student working part time in research, particularly if the college is in juxtaposition to an academic medical center. Good students should not have difficulty gaining access to a medical school with a major investment in research.

The medical student who is earnestly interested in research has many choices, including a combined M.D.–Ph.D. program, concentration on electives in research, or continuing responsibility as a participant in a program headed by an established investigator. Obstetrics and gynecology departments should have enough attractive opportunities to draw the best students.

During the residency period in obstetrics and gynecology there should be a parallel track for scholars in that discipline to undertake part-time or full-time uninterrupted work in the laboratory of an established investigator, preferably in the basic sciences. This experience should be in addition to, and not a substitute for, the best clinical training; the total residency program would therefore be longer. Research time not related to patient care should be supported by special NICHD funds, similar to the funding of academic scholars in surgery by the National Institute of General Medical Sciences that was developed in 1961. It is to be hoped that the academic scholar in obstetrics and gynecology will have had significant research experience in medical school.

Postresidency, as a junior faculty member, there should be two kinds of developmental support: a type of Research Career Development Award (RCDA) support by the NICHD and other agencies for the potential career investigator; and a program of

partial salary support for a limited number (ten to twenty) of faculty scholars on a national basis, similar to the former Markle Scholar Program. This could be the responsibility of a philanthropy such as the Macy Foundation. The objective would be to identify the future academic leadership of obstetrics and gynecology, including departmental chairmen who might be sitting around this table in the 1990s pondering about obstetrics and gynecology in the twenty-first century.

What are the differences between a suggested RCDA program and a foundation-supported scholar program? In the former, the candidates are selected almost exclusively for their research potential, hoping for an occasional Nobel laureate. In the latter, broader qualities are sought, in addition to research, including potential for group leadership; as with the Markle program, each institution would nominate one candidate a year and the final selection would be made by a national committee. Both these types of awards could be for as short a period as three to five years, to enable the individual to become established in her his future academic track without being compelled to earn compensation exclusively through patient care or as a dependent coinvestigator of a senior faculty member. It would be worthwhile for the recipients of both types of awards to meet jointly on an annual basis in a setting such as Williamsburg to permit the "socialization" of the next generation of research and academic leaders. Running in and out of major guild meetings dominated by their elders does not permit the development of such important informal relationships.

This proposal marks a unique opportunity for the federal and private sector to work together in a high-multiplier program. In contrast, our woes in the recent past have come from the two sectors either functioning independently or in an adversarial relationship. Foundations tend to shy away from programs subsequently adopted by the government; they also migrate in and out of programmatic areas without looking at the impact twenty years down the pike. The federal government has its own problems, which include a lack of institutional memory, and change for political expediency in the absence of long-range planning and the setting of priorities. Today over $2 billion of our federal taxes are

spent on care of end-stage renal disease versus $16 million spent by the NICHD in research related to maternal-child welfare.

In a time of limited fiscal resources, our nation is long overdue in setting some priorities. Keeping in mind that every mentally retarded child born in North Carolina will cost the taxpayer $1.5 million during its lifetime (and North Carolina is one of the least expensive states), I cannot help but set my own national priorities for support as the following programmatic areas:

- Human genetics: research and counseling. All that is known *today* is not available to our fellow citizens.
- Perinatal care and identification of high-risk pregnancies.
- Preventive pediatric care.

In order to develop these programs, which will affect the health of our country in the twenty-first century, we need to nurture the future leaders of obstetrics and gynecology. It is clearly an area where a limited investment of "seed money" will have a major high-multiplier effect. It is a unique opportunity for a government agency and a major foundation to join hands and look at the quality of life in the next several generations.

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Academic obstetrics is currently at a stage where it is possible to reflect on past developments; to assess the current state of the science; to chart directions for the future; and to determine what actions must be taken now to set a course for the future.

The Macy Foundation, in cooperation with the National Institute of Child Health and Human Development, brought together leading representatives of academic obstetrics, academic pediatrics, and public health to examine the state of teaching and research in obstetrics and to consider it with reference to developments in other academic disciplines.

The participants recommended directions for the future of the specialty and concluded that a critical element is the training of senior research obstetricians who will become leaders in the field during the next decade. The group also agreed that a program of senior fellowships dedicated to training clinical investigators should be encouraged. Such a program will perpetuate and enhance research in the prevention and treatment of the major disorders that affect the pregnant woman, the fetus, and the infant.

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